

Measuring Resilience: A Concept Note on the Resilience Tool

I. INTRODUCTION

The resilience tool provides a framework for understanding the most effective combination of short and long term strategies for lifting families out of cycles of poverty and hunger. It is based on the principle that the factors that make households resilient to food security shocks must first be understood, and then strengthened.

The resilience framework looks at the root causes of household vulnerability instead of trying to predict how well households will cope with future crises or disasters. It also considers how household food security links to the entire food system.

Factors that make households resilient to food security shocks and stresses include:

- income and access to food;
- assets such as land and livestock;
- social safety nets such as food assistance and social security;
- access to basic services such as water, health care, electricity, etc.;
- households' adaptive capacity which is linked to education and diversity of income sources; and
- the stability of all these factors over time.

These factors are combined into an index which gives an overall quantitative "**resilience score**". The score clearly shows where investments need to be made to further build resilience. By using this quantitative approach, decision makers can objectively target their actions and measure their results over time.

What is resilience?

A commonly used definition of resilience is "the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change" (Adger 2000).

In a food security context, resilience is defined as "the ability of a household to keep with a certain level of well-being (i.e. being food secure) by withstanding shocks and stresses." This depends on available livelihood options and on how well households are able to handle risks. This definition implicitly considers both (ex-ante) actions that reduce the risk of households becoming food insecure, and (ex-post) actions that help households cope after a crisis occurs.

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Why measure resilience?

The insight of why and how people become food insecure suggests ways of preventing this from happening. If interventions are designed in ways that increase resilience by enhancing people's ability to manage risk over time, then the need for humanitarian interventions when hazards occur will diminish.

However, resilience analysis should not be seen as an alternative to vulnerability analysis, but as a complement. Vulnerability analysis tends to measure only the susceptibility of people to damage when exposed to particular hazards or shocks. It often focuses on one specific target variable, usually represented by the household consumption expenditure.

Moreover, the lack of long-term reliable panel data means that vulnerability analysis as applied at present is appropriate only for cross-sectional surveys. This approach risks oversimplifying a more systemic view of household strategies by reducing the relevance of long-term components (Azam and Imai 2009). Resilience analysis, on the other hand, uses a systemic approach which incorporates both short and long term factors.

II. METHODOLOGY

Data and Software Requirements

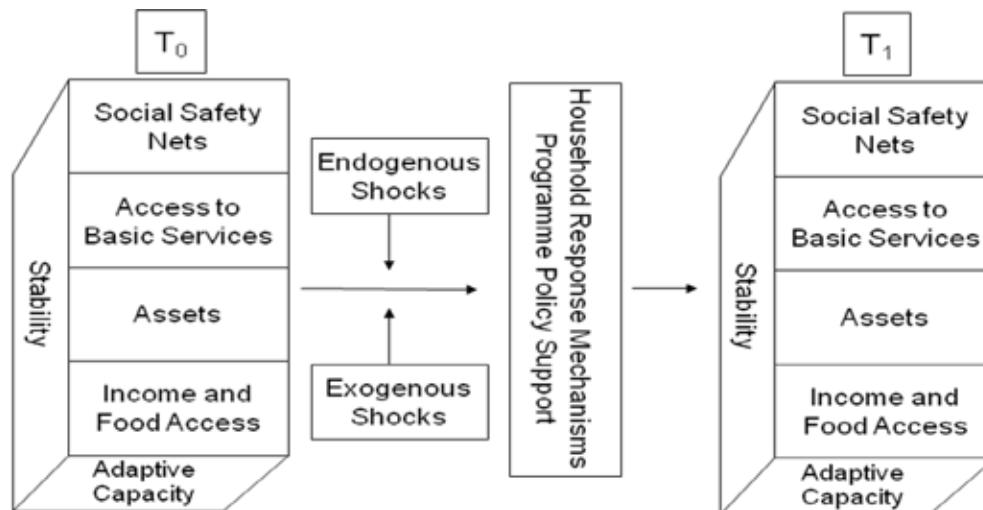
The resilience tool uses data readily available in national household budget surveys such as the Living Standard Measurement Surveys (LSMS) or Household Income and Expenditure Surveys (HIES).

The data can be analysed using any statistical analysis software. However, specific procedures have been designed for working with STATA.

The Resilience Model

Figure 1 summarizes the rationale for measuring resilience to food insecurity. It assumes that the resilience of a given household at a given point in time, T_0 , depends primarily on the options available to that household for making a living. This includes its access to assets, income-generating activities, public services and social safety nets.

Fig. 1



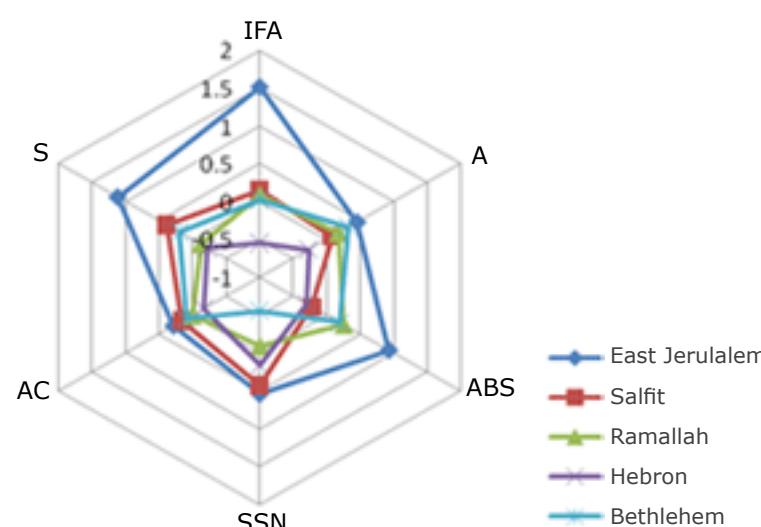
At time T_0 , each component is estimated separately to generate a composite index of household resilience. The different components observed at time T_1 reflect how changes in these factors influence household resilience. In algebraic terms, the resilience index for household i can be expressed as follows:

$$R_i = f(IFA_i, ABS_i, A_i, SSN_i, S_i, AC_i)$$

R = resilience; S = stability; SSN = social safety nets; ABS = access to basic services; A = assets; IFA = income and food access; and AC = adaptive capacity.

The six components of the resilience framework each have a specific set of indicators. These are combined and weighted to come up with an overall index called the "resilience score". Radar charts are used to visualize relationships between the components and other variables such as location (see fig.2) or gender.

Fig.2 Components of Resilience in five West Bank's governorates (Palestine)



The methodology has been validated using the Classification and Regression Trees (CART). The validation process defines precise decision rules that will make it easier to classify household resiliency using simpler datasets built for monitoring purposes.

Common Indicators for Each Component of the Resilience Model

Component	Indicators
Income and Food Access	<ul style="list-style-type: none"> • Average per person daily income (local currency/person/day) • Average per person daily expenditure (local currency / person/day) • Household food insecurity access score • Dietary diversity and food frequency score • Dietary energy consumption (kcal/person/day)
Access to Basic Services	<ul style="list-style-type: none"> • Physical access to health services (ordinal, 1 to 3) • Quality score of health services • Quality of educational system (ordinal, 1 to 6) • Perception of security (ordinal, 1 to 4) • Mobility and transport constraints (ordinal, 1 to 3) • Water, electricity and phone networks (count)
Social Safety Nets	<ul style="list-style-type: none"> • Amount of cash and in-kind assistance (local currency/ person/day) • Quality evaluation of assistance (ordinal, 1 to 4) • Job assistance (binary yes/no response) • Frequency of assistance (number of times assistance was received in the last six months) • Overall opinion of targeting (assistance targeted to the needy; to some who are not needy; or without distinction)
Assets	<ul style="list-style-type: none"> • Housing (number of rooms owned) • Durable index (Principal Component Analysis on list of items: TV, Car, etc...) • Tropical Livestock Unit (TLU) equivalent to 250 KG; • Land owned (in hectares)
Adaptive Capacity	<ul style="list-style-type: none"> • Diversity of income sources (count, 0 to 6) • Educational level (household average) • Employment ratio (ratio, number of employed divided by household size) • Available coping strategies (count, 0 to 18) • Food consumption ratio (Share of food expenditure divided by total expenditure)
Stability	<ul style="list-style-type: none"> • Number of household members that have lost their job (count) • Income change (ordinal; increased, the same, decreased) • Expenditure change (ordinal; increased, the same, decreased) • Capacity to maintain stability in the future (ordinal, 1 to 5) • Safety net dependency (share of transfers on the total income) • Education system stability (ordinal; quality increased, the same, decreased)

III. POLICY IMPLICATIONS

The resilience framework uses a systemic approach and assumes that change is constant. Unlike other frameworks which tend to control change and assume that systems are relatively stable, it lays the groundwork for policies which help socio-economic systems cope with, adapt to and even shape change.

Furthermore, it provides a framework for combining both short and long term actions to increase resilience. These include short term actions aimed at supporting households' own coping strategies during the acute phase of the crisis, and long term actions such as investment in health and education which build resilience over time.

By pinpointing the specific factors which make household resilient, the framework gives decision makers clear indications of where to intervene. For example, resilience analysis in Palestine shows that there is a big difference in how households headed by women and those headed by men cope with shocks. Women have fewer assets and less access to different sources of income than men. Thus, households headed by women rely heavily on public services and social safety nets. A policy which further cuts safety nets and public services would thus have a severely negative impact on these women and their families.

Sound resilience analysis requires substantial investment in collecting and analysing data. However, the resulting analysis provides a sound quantitative baseline for policy decisions. This baseline can be supplemented with more rapid information gathering methods, based on participatory approaches, when crises strike. In addition, much of the required information can be extracted from the Living Standard Measurement Surveys (LSMS) which many countries regularly conduct.

Further Reading :

Alinovi, L., Mane, E. and Romano, D.
(2010) "Measuring Household Resilience to Food Insecurity: an Application to Palestinian Households", in Agricultural Survey Methods, by Benedetti et al. (eds.), John Wiley & Sons, April 2010.

Note: an earlier version of the article was published in:

FAO. 2008. *Deriving Food Security Information from National Household Budget Surveys*. Sibrián R. (ed). Available at: <http://www.fao.org/docrep/011/i0430e/i0430e00.htm>

Box 1 – Applying the resilience model in Palestine

The resilience tool has been extensively tested in Palestine where families have faced continuous stress, and continually high levels of food insecurity and poverty. It was piloted in Palestine in 2007 and has been replicated using Socio-Economic and Food Security Survey (SEFSec) in 2009 by FAO in cooperation with the World Food Programme (WFP) and the Palestinian Central Bureau of Statistics (PCBS).

Key findings from the study include:

- Households headed by women rely more heavily than male headed households on public services and social safety nets, since they have relatively few assets and available sources of income.
- Resilience analysis helps aid agencies understand how effective targeting has been. For example, a recent report shows that although people in rural Um Al Naser district scored poorly on the resilience index, they do not receive adequate aid.
- Families living in refugee camps in Gaza scored well on stability indicators and may be better off than people in rural areas who have little access to basic services.

Under a cooperative agreement with United Kingdom's Department for International Development (DFID), resilience tool is being refined and used for further analysis in Palestine.