

# Introduction of *RISE* Assessment Tool into Armenian Agriculture



**Vardan Urutyan<sup>1</sup>, Fritz Häni<sup>2</sup>, Cristoph Studer<sup>2</sup>, Hans Porsche<sup>2</sup>,  
Christian Thalmann<sup>2</sup>, Artur Grigoryan<sup>1</sup>**

<sup>1</sup>International Center for Agribusiness Research and Education (ICARE)  
74 Teryan St. Yerevan 0009, Armenia

E-mail: [vardan@icare.am](mailto:vardan@icare.am)

<sup>2</sup>Department of International Agriculture, Swiss College of Agriculture,  
Länggasse 85, Zollikofen, BE, Switzerland

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## PROBLEM STATEMENT

Since the collapse of the Soviet Union, the Armenian agriculture is facing severe problems, particularly with regard to marketing of farm produce. Levels of food consumption for a large percentage of the population fell far below the poverty line. A major shift has taken place to the cultivation of basic food crops for own consumption (cereals, potato) at the expense of fodder crops, fruit trees and vineyards and industrial crops. As a result, the Armenian small-holder agriculture has been transformed into a mixed crop/livestock farming system. Crop and livestock production yields are low as a result of the use of small quantities and poor qualities of agricultural inputs and inadequate farming practices.

Agricultural production in Armenia is well below its potential. In order to improve and develop efficient and sustainable agriculture the Ministry of Agriculture, jointly with the FAO, designed a "Strategy for Sustainable Agricultural Development" for Armenia (MoA/FAO 2002, 2004).

The strategy has the following objectives:

- to achieve real income growth of farmers through increased agricultural productivity in a sustainable manner;
- to provide opportunities for real income growth of off-farm rural poor; and
- to improve the food security of the urban population of Armenia, especially that of the poorest segments.

We advocate that several components of the above-mentioned strategy are in the scope of the **RISE** (**R**esponse-**I**nducing **S**ustainability **E**valuation) tool (Häni et al. 2002, 2003a, and 2003b, Studer et al. 2005). RISE can be considered a very useful and important tool to analyze and ease the current situation in the Armenian agriculture, and to achieve the objectives of the strategy. Through its dual benefit of (1) facilitating/inducing improvements at the farm level and (2) allowing for the identification of potentials and bottlenecks at larger scale, the use of RISE allows for simultaneous research and development on the ground.

## BACKGROUND AND INTRODUCTION

The project described here aims at analyzing the sustainability of agricultural production in Armenia and at improving it through farm advice and the facilitation of policy action to adapt framework conditions by using the **RISE** model. The RISE was developed by the Swiss College of Agriculture to assess and visualize the sustainability at farm level. The holistic sustainability assessment covers ecological, economic and social dimensions. The tool identifies strengths (potentials) and weaknesses with regard to sustainability, hereby providing the farmer with a testimonial on one side and the identification of intervention points for improvement on the other. RISE thus not only aims at diagnosis, but rather at the initiation of measures to improve sustainability of agricultural production. As a monitoring tool, RISE can visualize trends and developments over time on individual farms as well as within sectors or catchment areas (Häni et al. 2005).

A comprehensive questionnaire is being used in RISE sustainability evaluation. The indicators are calculated by the computer program RISE\_1.0, which was launched in spring 2005. A feedback discussion of the results with the farmer takes place after the indicator calculations, yielding ideas for potential measures to improve the current situation. Besides identifying specific measures at farm level to improve the situation, the analysis of larger samples can assist relevant institutions in identifying ways to adapt framework conditions (the political and economic environment) in order to improve prevailing weaknesses regarding the sustainability of agricultural production (e.g. Armenia Project).

In order to be able to introduce RISE assessment tool in Armenia, two Armenian team members, under the Swiss National Science Foundation's SCOPES Joint Research Project funding, received an intensive, one week training in interview and data processing in Zollikofen, Switzerland. Back in Armenia, the Armenian team started to adapt the RISE methodology and conduct several assessments at farm level.

The introduction of RISE to Armenia aims at substantially contributing to a sustainable production of agricultural products in Armenia. To this end, a core group of young scientists was introduced to RISE and the principles of sustainable agricultural production, and are disseminating this knowledge through the International Center for Agribusiness Research and Education (ICARE), a non governmental foundation, and the Armenian State Agrarian University (ASAU). The RISE methodology was customized to Armenian conditions and tested in a pilot project covering different (typical) farm types with a special focus on the dairy sector.

## **MATERIALS & METHODS**

### *RISE Methodology*

RISE is a system-oriented tool assessing the farm enterprise in a holistic way based on 12 indicators covering ecological, economic and social aspects through about 60 parameters (Porsche et al., 2004). Each sustainability indicator contains parameters that outline the state (S) of the system and parameters that describe a driving force (D) on or within the system, driving it in a certain development direction. This allows a combination of a systems and an analytical approach. D allows considering the long-term tendencies and risks whereas S can serve as an analytical database for the actual situation. State parameters have a value between 0 (worst case) and 100 (best case). Driving force parameters are also computed on a scale between 0 and 100, but since they are valued as a negative pressure on the system, 0 indicates the best case and 100 the worst (biggest pressure). The Degree of Sustainability (DS) is calculated as  $DS = S - D$ . Individual indicators are considered sustainable if DS is above +10, the whole farm is considered sustainable if no indicator has a DS below -10 (Häni et al. 2003b, Studer et al. 2005). Values between -10 and +10 are here called threshold values because they represent a transition zone that borders on the one side sustainable and on the other side non-sustainable values.

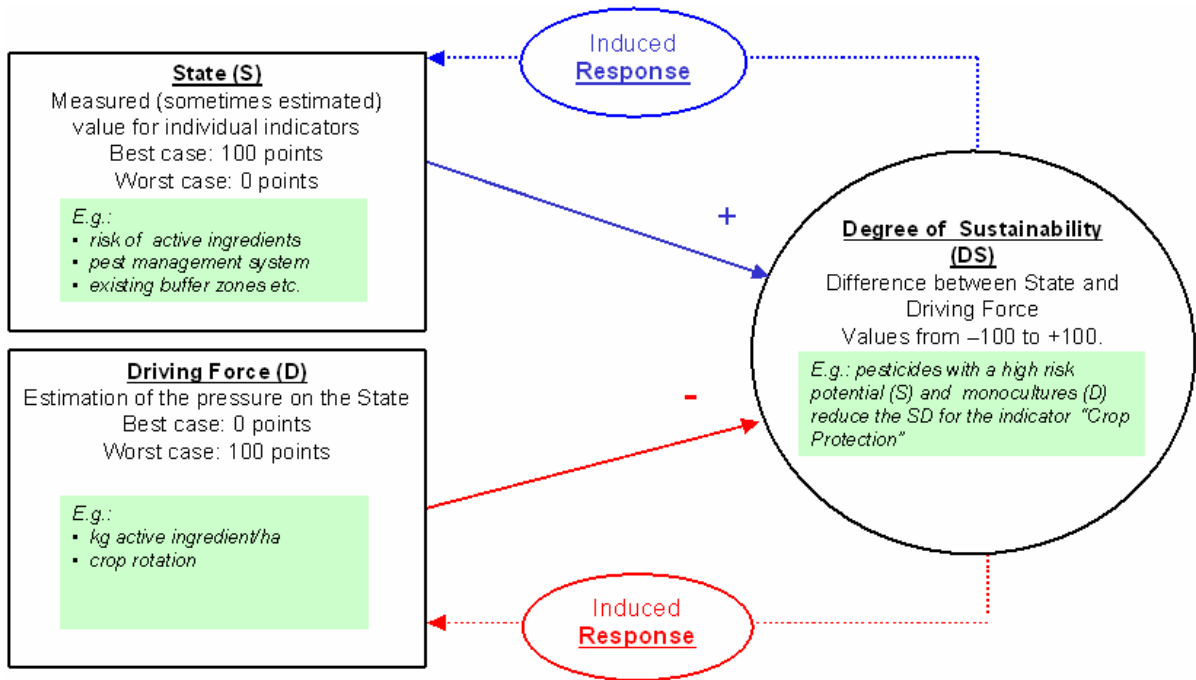


Figure 1: Methodology to calculate the degree of sustainability.

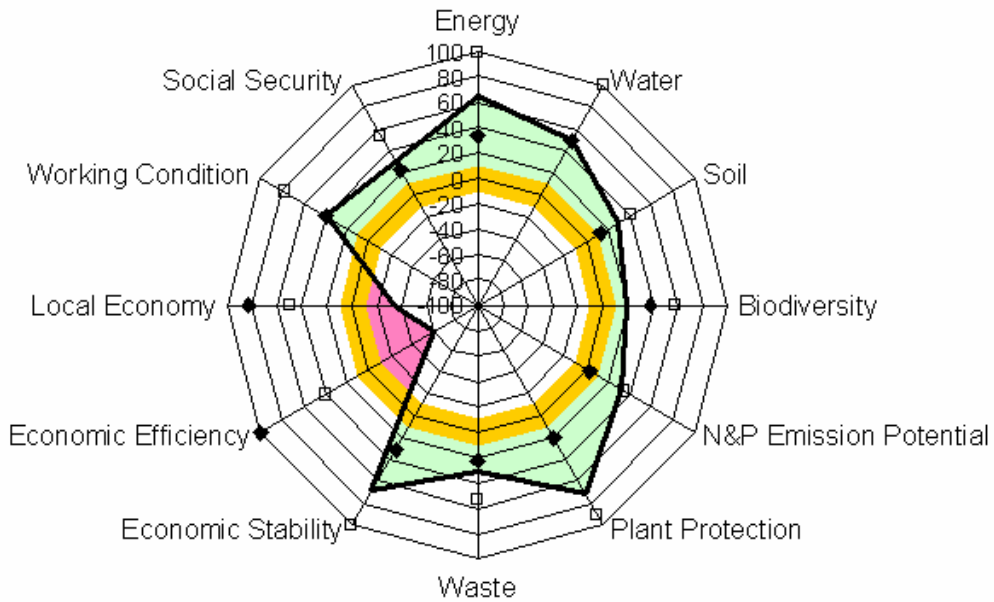


Figure 2: RISE Indicators and Sustainability Polygon

<ul style="list-style-type: none"> <li>• Energy</li> <li>• Water</li> <li>• Soil</li> <li>• Biodiversity</li> </ul>	<b>Natural resources</b>
<ul style="list-style-type: none"> <li>• Emission Potential (N&amp;P)</li> <li>• Plant Protection</li> <li>• Waste</li> </ul>	<b>Management</b>
<ul style="list-style-type: none"> <li>• Economic Stability</li> <li>• Economic Efficiency</li> <li>• Local Economy</li> </ul>	<b>Economy</b>
<ul style="list-style-type: none"> <li>• Working Conditions</li> <li>• Social Security</li> </ul>	<b>Social situation</b>

### Data collection

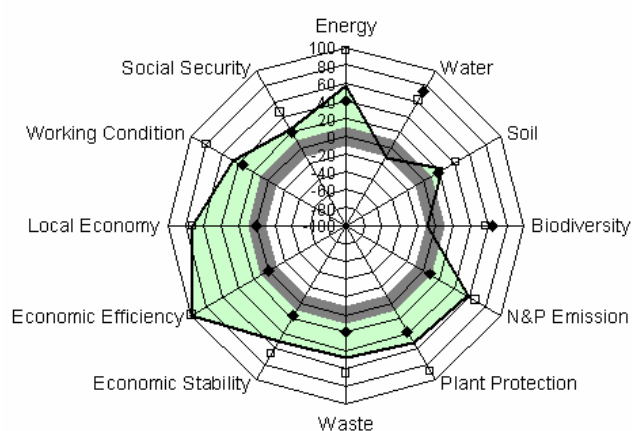
The first RISE assessments in Armenia were completed on-site by two Armenian researchers, who had been trained at the Swiss College of Agriculture. Later a group of 4 young researchers received the RISE training from the project initiators. For the pilot project dairy sector was selected and 14 dairy farms from 5 provinces of Armenia have been assessed by the trained researchers. Data were entered into the RISE\_1.0 computer program provided by the RISE team in Switzerland. Thanks to already constructed sub-databases, lists of inventory, machinery, animal, crops, etc. in the computer program, it was possible to significantly decrease the time needed for data entry. The data was also reviewed and evaluated by Swiss partners for consistency and integrity.

## RESULTS

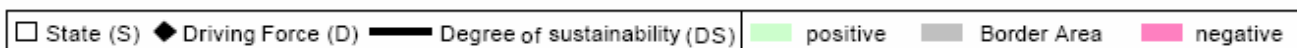
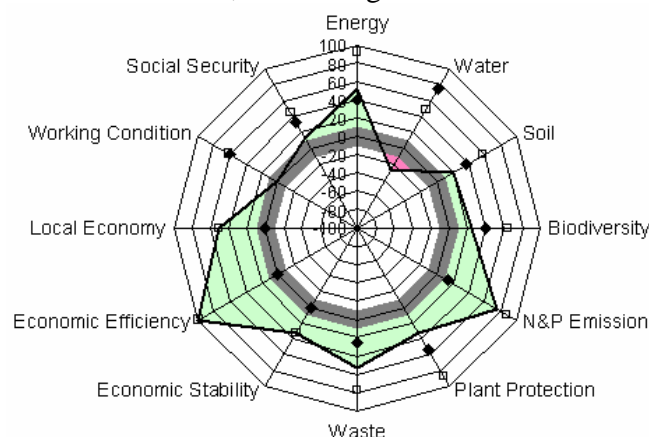
The results of 4 farms analysed out of 14 farms are displayed below.

Figure 3: Results for Farm 1 and Farm 2 (Lori Marz).

**Farm No 1:** 4 work forces (FTE)  
61.3 ha, 30 milking cows



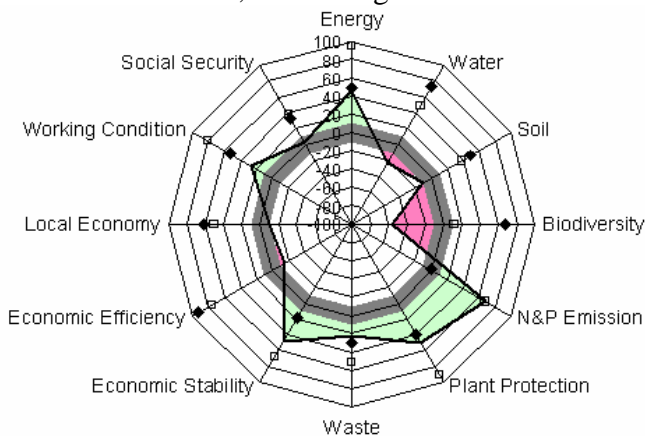
**Farm No 2:** 5 work forces (FTE)  
65 ha, 23 milking cows



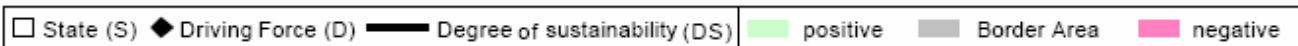
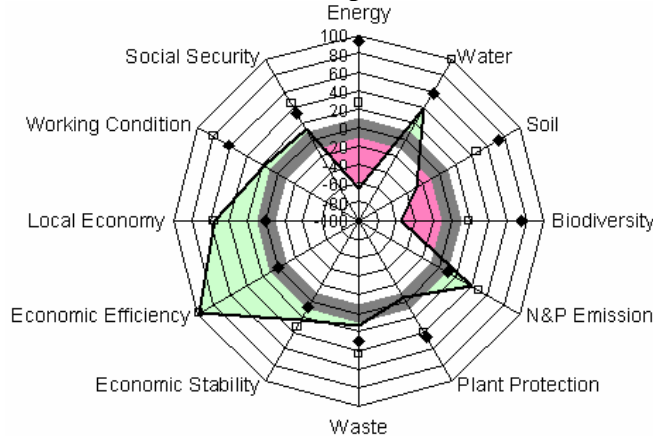
Farm No 1 and Farm No 2 were located in Lori, which is known as a dairy region. The area of Lori marz is at 1600m -1700m above sea level, the maximum elevation being 3196m. The farms did well on economic indicators but relatively bad on ecological indicators. The Water indicator displayed unsustainable situation as both farms had unstable water supply for plant protection and animal production. Soil indicator shows positive results for both farms but it's close to threshold value. These farms had never had soil nutrient analysis. Farm No 2 had plots with 100% visible erosion. Biodiversity indicator of Farm No 1 showed unsustainable situation, which is mainly due to an overall high intensity of production that includes fertilisation of all plots and regular pesticide applications. Compared to Farm No 1, the Farm No 2 didn't do well on social indicators. Both "Working Condition" and "Social Security" indicators displayed threshold values close to unsustainable situation. Workers didn't have written contracts, there were no emergency or rescue plan and emergency materials in case of an accident, the workers were heavily exposed to dust and noise, etc. "Social Security" indicator highlights some common situations in many farms analysed: old-age pension schemes, unemployment-, health-, accident- and disability insurance, protection against loss of earnings and against dismissal do not exist. The employees had private solutions, which were not sufficient. The wage differential at comparable work was relatively high in Farm No 2 (about 40%).

Figure 4: Results for Farm 3 and Farm 4 (Aragatsotn Marz).

**Farm No 3:** 9 work forces (FTE)  
117 ha, 60 milking cows



**Farm No 4:** 6 work forces (FTE)  
11 ha, 30 milking cows, 100 sows



Farm No 3 and Farm No 4 were located in Aragatsotn province of Armenia, known with fruit orchards and mixed dairy farming. The Farm No 3 displayed unsustainable situation in the majority of indicators. Both farms did very badly on ecological indicators. Farm No 3 shows sustainable performance on Energy indicator, which is due to low energy input per hectare. Somewhat sustainable situation shows Farm No 4 water indicator, due to both stable water quantity and quality. The reason is that the farm is located nearby the water canal. Soil and Biodiversity indicators displayed negative performance due to the reasons mentioned in Farm No 1. Here also the farms were lacking ecologically valuable field margins and the plots were most of the time with individual elements. The farms had never had soil nutrient analysis. The

Farm No 4 had very high amounts of waste produced and disposed on farm. “Plant Protection” indicator of Farm No 4 was on border value due to high quantities of PP means and applications.

“Working Condition” and “Social Security” indicators were similar to that of above-mentioned farms. Again workers didn’t have written contracts, there were no emergency or rescue plan in case of an accident. Overtime hours were not compensated. Compared to Farm No 4 economic indicators, Farm No 3 showed a very poor performance. This farm operates in loss and worker salaries absorb more than 60% of total revenues.

## **CONCLUSIONS**

The RISE program is being successfully tested on dairy farms in different regions of Armenia. Although the results are preliminary and can not be generalized, one thing is obvious: RISE proved to be a suitable tool for the holistic evaluation of Armenian dairy farmers’ sustainability. It is expected that the project will have a significant impact on the sustainability of agricultural production and the entire agricultural sector in Armenia. It has to be stressed that applying RISE not only targets a more rational use of the natural resources (energy, water, soil, biodiversity) and improved management practices (reduced emissions, proper crop protection and waste management). Through its holistic approach the tool also covers the most important economic and social aspects. Economic stability and efficiency of farming (including adequate income) and its effect on local economy (e.g. employment generation) as well as social security and working conditions in the agricultural sector are covered by the tool. These aspects are particularly important in a country like Armenia. A particular strength of the application of RISE is that it allows for the dual benefit of simultaneous research and development (i.e. improvements) on the ground. By establishing the basis for research (through sustainability assessments at farm level) improvements of farming practices are directly initiated in the feedback discussions between advisors or extension agents and farmers. The development and implementation of training modules by Armenian team members at the International Center for Agribusiness Research and Education and the Armenian State Agrarian University will raise awareness with students, scientists and extension services on the complexity and importance of sustainability issues in agriculture.

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