Food and Agriculture Organization of the United Nations

WATER USE IN LIVESTOCK PRODUCTION SYSTEMS AND SUPPLY CHAINS

SUMMARY OF THE GUIDELINES FOR ASSESSMENT

OVERVIEW

Water is essential to life and a crucial factor in agricultural food production. OECD (2010) reported around 70 percent of global freshwater withdrawal was used by agriculture. During the last century, irrigation played an important role in increasing and stabilizing crop yields and, together with the "green revolution", has led to improving nutritional alimentation in many countries.

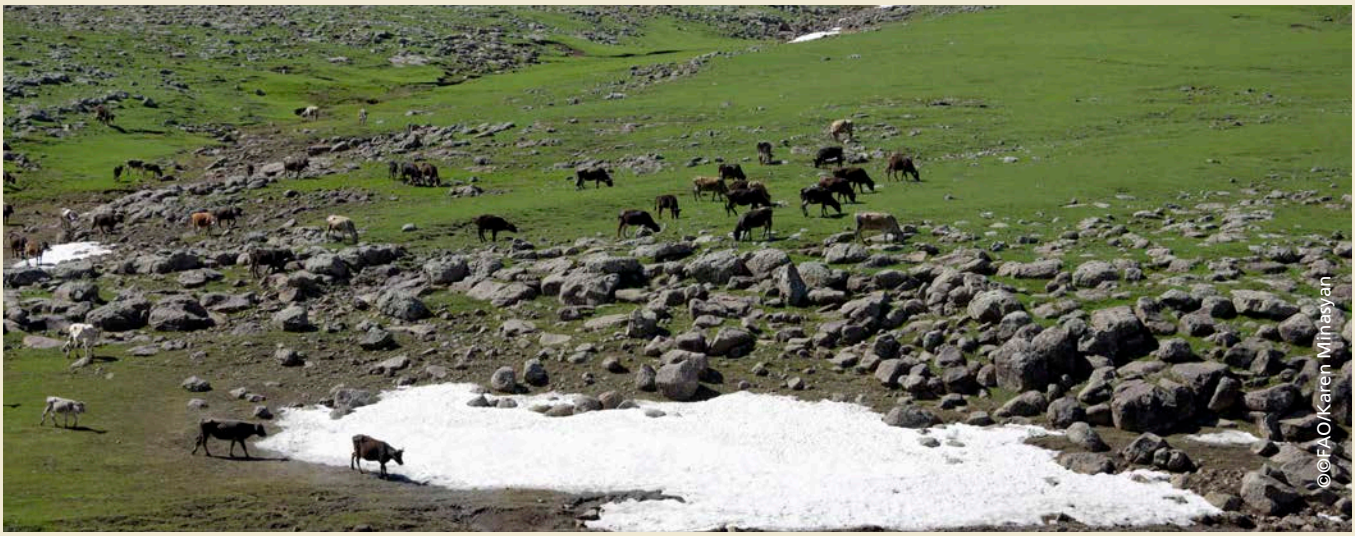
The livestock sector is already a major user of natural resources such as land and water, currently using about 35 percent of total cropland and about 20 percent of blue water for feed production. It has been estimated that the livestock sector uses an equivalent of 11 900 km³ of freshwater annually – or approximately 10 percent of the estimated annual global water flows (111 000 km³). In addition, it is estimated that in 2010, 2 290 km³ of green water and 370 km³ of blue water was attributed to feed production on cropland.

An initial comparison of a range of different models, confirmed that green water use in global crop production is about 4–5 times greater than consumptive blue water use. Hence, the full green-to-blue spectrum of agricultural water management options needs to be considered when tackling the increasing water gap in food production.

The expected increase in world population up to 10 Bn people will reduce the available freshwater resources by half to 6 300 m³ per capita in 2050. The larger world population will lead to increased food demand by 70 percent to 90 percent in 2050. There is growing recognition of the growing competition between users, hence understanding the distribution and demands for freshwater in livestock production is important.

Water use for feed and livestock is an integral part of agricultural water resource management, considering the type of production system (e.g. grassland, mixed crop–livestock or landless) and scale (intensive or extensive), the species and breeds of livestock, and the social and cultural aspects of livestock farming in various countries. Water intake is related to animal size, age, ration (e.g. type of feed, dry matter content), activity, productivity and temperature.

Livestock production is complex, characterized by a variety of production practices and systems. To contribute to a better insight into the demand for freshwater in a specific region and to improve the performance of individual farms as well as of the whole supply chain, there is a need for water consumption studies to include detailed farm level data regarding climate, agricultural practices and utilization of feed.



CHALLENGES AND SOLUTIONS

There is a need for widely recognized frameworks for the assessment of the performances of feed and livestock systems and of livestock products to mitigate negative impacts on water resources.

The LEAP Partnership set up a Technical Advisory Group (TAG) on water in 2016, in order to harmonize assessment approaches in this area and hence drive environmental improvement based on best practice and latest science. The TAG was composed of experts coming from all regions of the world. To facilitate guideline development technical workshops were held at Food and Agriculture Organization (FAO) headquarters and in Rwanda.

Historically two scientific communities (i.e. the Water Footprint Network and the Life Cycle Community) have focused on methodology and indicators for water fooptrinting. This guideline points to aspects of these methodologies in different sections, and with specific recommendations. A common glossary was created between the two communities to stimulate the use of harmonised terms and definitions. Harmonization was also achieved at the accounting level for water flows.

Potential environmental impacts associated with water use are assessed following the ISO 14046 standard, focusing on blue water scarcity footprint.

To equip practitioners with a methodology allowing not only to assess the impact but also to improve the management, the scientific community on water productivity was also involved in the guidelines development. Water productivity metrics are described based on the assessment framework by Molden (1997), Molden *et al*. (1998), Molden and Sakthivadivel (1999), Descheemaker *et al*. (2010), and Prochnow *et al*. (2012), and the guidelines from *The Water Footprint Assessment Manual* (Hoekstra *et al*., 2011). The metrics from these two approaches go hand in hand in providing an understanding of the pressure exerted by the livestock production sector on the water resources worldwide, in order to support potential improvement of its water productivity as well as reduction of livestock's contribution to water scarcity.

A methodology and indicators were recommended for water footprinting also in view of the Sustainable Development Goals (SDG). Distinction was also made between water use efficiency and water productivity. Water use efficiency refers to ratio or percent of water effectively used by the plant, e.g. water use efficiency is 80 percent if 10 mm of irrigation water a day is added to a crop while 8 mm are used through the root water uptake and 2 mm are lost by drainage below the root zone, or via unproductive soil evaporation. The numerator and denominator have the same units. Water productivity is the metric used in this document and refers the ratio of the benefit to the amount of water consumed, e.g. it is 50 kg grain per 1 m^3 of water.

The document is relevant for feed and livestock production systems, production and processing of livestock products (cradle-to-gate). It addresses all livestock production systems and livestock species considered in existing LEAP guidelines: poultry, pigs, small ruminants, and large ruminants supply chains.

While the TAG on water focused on feed and livestock systems, the terms and definitions as well as the methodology for water flow accounting and assessment can be used for all production systems in agriculture.

©FAO/Simon Mair

LIVESTOCK ENVIRONMENTAL ASSESSMENT AND PERFORMANCE (LEAP) PARTNERSHIP

www.fao.org/partnerships/leap/en

Livestock-Partnership@fao.org

© FAO, 2019

Some rights reserved. This work is available under a CC BY-NC-SA 3.0 IGO licence

CA6649EN/1/10.19