water footprint network

fair & smart use of the world's fresh water

Water Footprint: Key to Sustainable Development in Sub-Saharan Africa

World Bank statistics indicate that 75% of the world's poorest countries are located in Sub-Saharan Africa. Most of the population relies on agriculture as the main source of livelihood, yet the sector is beset with many challenges. Enhancing agricultural performance is considered by numerous Sub-Saharan countries to be central to social and economic development in the region and to the achievement of the UN Sustainable Development Goals.

Agriculture is the largest consumer of water in sub-Saharan Africa and a rapidly rising population is increasing food demand and water scarcity. Staple food and export crops are often produced inefficiently, consuming more water resources and getting less yield than the global benchmark for these crops.

Implementing practices and policies that improve water and land productivity in crop production would directly contribute towards improved livelihoods, helping to reduce poverty while increasing food security. Doing this while maintaining sustainable river basins would support access to clean water and help maintain the region's ecosystems.

Water Footprint Profiles

In 2016, Water Footprint Network was commissioned by the Netherlands Ministry of Foreign Affairs to produce Water Footprint Profiles for seven Sub-Saharan African countries: Benin, Ethiopia, Ghana, Kenya, Mali, Mozambique and Rwanda. The project was conducted to support the Ministry's target of increasing water productivity by 25% in Dutch financed projects.

This is the first series of assessments of this kind in the region. The aim is to use the water footprint to build an understanding of water use in each country in order to advance sustainable development by informing policy and guiding investments that will achieve fair and smart use of the region's fresh water.

The profiles provide an overview of:

- Water use in each country, from the perspective of the goods produced within the country;
- A comparison of major crops produced against global water footprint benchmarks to assess how efficiently water is being used in producing a crop and the potential for increasing water and land productivity;
- The sustainability of water used for crop production in each country when compared with water availability;
- The consumption of goods (in particular agricultural crops) by citizens of that country; and

- Whether these goods are produced domestically or imported from other countries.

The analyses presented in the Water Footprint Profiles provide insights into issues that must be addressed if we are to achieve food security and end hunger, sustain river basins and healthy ecosystems, and advance sustainable economic development in Sub-Saharan Africa.

Key learnings:

Agriculture is a significant contributor to the economy of all seven countries studied, ranging from 22% of the GDP in Ghana to 42% in Ethiopia. Significant numbers of people are employed in agriculture – the lowest being 45% of the total workforce in Benin and Ghana, while in Ethiopia, Mozambique and Rwanda it is three quarters or more of the total workforce. Most of these farmers are small holders.

A majority of the water footprint in all of the countries is used to grow agricultural crops and for livestock. Many of the crops are primarily rain fed. The most common irrigated crops grown in the seven countries are rice and sugar cane.

Staple food crops are produced inefficiently, consuming more water and land resources than the global water footprint benchmark for these crops. Improving the productivity of water and land used in crop production would improve food and economic security.

If key export crops were produced with higher levels of water and land productivity, it would provide greater levels of export value for the same amount of water and land area used. For example, sugar cane produced in Kenya is more efficient than the global water footprint benchmark while in Mozambique, sugar cane consumes six times as much water per tonne of production, compared to the global benchmark. If sugar cane production in Mozambique met the global water footprint benchmark, the same amount of water could produce four times as much sugar cane than is produced now. Tea is also produced more efficiently in Kenya than the global benchmark.

Areas of Ethiopia, Kenya, Mali and Mozambique experience severe blue water scarcity 12 months of the year. Benin, Ghana and Rwanda face blue water scarcity during the dry season.

All seven countries use their water resources to produce export goods and they also import goods from other countries. Of the countries studied, only Ethiopia is a net virtual water exporter of blue water. That means it uses more of its surface and groundwater for export goods than is used in the goods it imports from other countries. All the other countries are net virtual importers of blue water.

All seven countries are net virtual water exporters of green water, with Ghana being the largest exporter of its green water at 12,151 Mm^3/year and Rwanda being the smallest green virtual water export at 233 Mm3/year. This means on balance, Ghana exports goods from rain fed agriculture that use 12,151 Mm^3/year more water than those that are imported. Rwanda exports from rain fed agriculture use only 233 Mm^3/year more water than those that are imported.

Putting this to work:

These Water Footprint Profiles lay the scientific foundation for identifying how integrated policy development and programmes aimed at green growth in these countries can support sustainable development. They can be used in discussions with ministries and departments concerned with water resource development and management, agriculture and economic development, trade and environmental protection and can support planning and policy development.

Pathways towards sustainable development:

More productive use of green water resources (rainfall) is a critical step in strengthening food security and climate resilience in Sub-Saharan Africa.
Increasing the productivity of rain fed agriculture can be achieved through building the capacity, especially of small-holder farmers, to implement a range of agricultural practices that increase yields. Practices may include providing access to better seeds, improving soil nutrition and moisture retention and reducing non-productive evaporation.

Securing environmental flows and regulating the use of groundwater resources before expanding irrigation will help avert negative consequences of overuse.
Many areas of Sub-Saharan Africa are already facing moderate to severe blue water scarcity for some or allof the year. Therefore, it is vital that any expansion of irrigation is planned with caution. Water availability and the protection of aquatic ecosystems, both now and under future climate change scenarios, must be assured before expanding the area of irrigated agricultural land. Surface water can be supplemented with deep groundwater resources, yet their sustainable use must be secured with measurement, monitoring and regulation to avoid future negative social, economic and environmental impacts from overuse.

Integrating policy for a holistic approach to development will help prevent conflicting aims across sectors slowing sustainable development.
The interlinkages between agriculture, trade, economic and energy policy and water resources management must be understood. A holistic approach to sustainable development will help ensure that the aims of each individual sector do not lead to unintended consequences that hamper progress and result in negative impacts on water resources and water-related ecosystems. Trade-offs in food security and water security

coming from reliance on internal or external water resources for food, export value and supply chain inputs should be investigated for a balanced approach to development.

Producing crops and using cropping systems that excel in water productivity will enhance livelihoods while reducing pressure on water resources.
Assessing agricultural crops for their comparative advantage in terms of water footprint from the global perspective and internally to the country would contribute to agriculture development that benefits people and ecosystems. Transitioning to crops that 'fit' the local conditions would provide benefits locally and be attractive to businesses reliant on these products in their supply chains.

Conclusion

The Water Footprint Profiles provide a scientific foundation for progress towards sustainable social and economic development in Sub-Saharan Africa. They reveal how progress both depends upon and supports a sustainable, reliable water supply of adequate quality and quantity. Further in depth evaluation into the valuable insights these analyses provide and the questions they raise can support inclusive green growth on a national and regional level.

Support to farmers could be guided by evaluating agricultural practices and identifying those that will improve yields and reduce water footprints for specific crops and locations. Crop selection could be informed by assessing their comparative advantage in terms of the water footprint from the global perspective and for particular locations within each country. More detailed Water Footprint Assessment could be undertaken to build an information base on when, where and how water is consumed or polluted. This would reveal whether water use is environmentally sustainable, economically efficient and socially equitable. With this knowledge, those concerned with water resources or agricultural and economic development, or with trade and environmental protection, can ensure that they plan infrastructure, water resources and regulatory frameworks that support development while maintaining valuable ecosystem services.

In practice, a balance must be struck between self-sufficiency and food security, export value and trade, infrastructure development and sustainable use of water and these issues must be taken up by governments and civil society, investors and businesses. Striking that balance within a holistic approach to development would result in fair and smart use of the region's fresh water while providing better livelihoods and stronger economies.