Focus and impact on poverty reduction, livelihoods, and jobs

Objective: Supporting millions of people living in rural areas under the extreme poverty line, and reducing the proportion living in poverty in all its dimensions

Today, we face multiple interlinked global challenges, including climate change, biodiversity loss, and large inequities in access to resources, which contribute, in turn, to growing food and nutrition insecurity, water stress, and energy poverty. The CGIAR Initiative on NEXUS Gains works at the critical intersection of water, energy, food, and environmental systems in selected transboundary river basins to realize multiple development benefits and reduce trade-offs.

NEXUS Gains works to achieve positive, measurable benefits across all five CGIAR Impact Areas, as outlined in the CGIAR Strategy to 2030: nutrition, health, and food security; poverty reduction, livelihoods, and jobs; gender equality, youth, and social inclusion; climate adaptation and mitigation; and environmental health and biodiversity. A key element of the nexus approach is understanding that impacts in one Impact Area can affect outcomes – positively or negatively – in all others.

Farmer managing a kitchen garden in rural Tajikistan. Photo by Madeline Dahm/IWMI.

Policy research and engagement in water, energy, food, and ecosystems (WEFE) address rural poverty most directly by increasing agricultural incomes and creating jobs. WEFE nexus approaches can increase access to clean energy, raise water use efficiency, and spin off revenue opportunities for women, youth, and people in marginalized communities. At the same time, productive agriculture can bring down inflated food prices for people living in poverty – who are usually net purchasers of food even in agricultural areas. The concept of multidimensional poverty captures the complexity of these connections across the nexus, because income-based poverty is only one element. Dimensions of health and living standards are variously influenced by peoples' access to nutritious food, water, and energy. The many sides of poverty therefore demand a cross-sectoral nexus approach that not only improves access to and use of resources, but also strengthens resilience against the risks that threaten sustainable livelihoods.

Work Package 1:
Trade-off and foresight methodologies

Supporting planners, policymakers, and investors with customized foresight and trade-off analysis tools to plan, assess, prioritize, and scale up climate-resilient interventions across the WEFE nexus.

The science of modeling trade-offs is an essential source of methods to understand impacts of interventions on livelihoods – and to avoid unexpected negative impacts that can devastate livelihoods and the environment. Harmful impacts on ecosystems are especially easy to overlook without comprehensive models, and this hurts the poorest and most marginalized in society who depend particularly on natural ecosystems. Modeling tools such as the Python water resources (Pywr) model, which NEXUS Gains has implemented in the Aral, Incomati, and Indus basins, can be used to assess monetary and non-monetary trade-offs before hydropower capacity is increased or more water is taken for irrigation. Other modeling tools have linked hydrological with computable general equilibrium models to assess the impacts of water and energy interventions on changes in agricultural growth and overall GDP.

One example is a study of the simultaneous economy-wide effects of dam construction in Sudan on riverine flood hazards, irrigation water supply, hydropower generation, and floodplain-dependent industries (traditional fired clay brick production). The study suggests a small increase in Sudan's GDP as a result of the upstream dam, with most welfare benefits accruing to urban households. A further study assessed the potential for water conservation in Pakistan through taxing water-intensive rice and sugarcane. Results suggest that water savings are possible, with different welfare impacts depending on the crop: taxing sugarcane results in small income gains for farm households, while taxing rice reduces incomes slightly for all households. A final study assessed water and energy interventions to reduce the negative impacts of climate change in Ethiopia. It found that non-poor rural households benefit the most from improved irrigation development, as they are more likely to cultivate high-value irrigated crops, while energy development benefits rural and urban households equally and appears to have a distribution-neutral impact.

Farmer planting rice in Pakistan. Photo by Fasseh Shams/IWMI.

CO-PRODUCING KNOWLEDGE ON WATER TRADE-OFFS

Water storage, both built and natural, can be managed to balance competing economic demands while safeguarding livelihoods and healthy ecosystems. Achieving this requires a shared evidence base for integrated management, and NEXUS Gains is working to strengthen that foundation in Ethiopia's Tana-Beles sub-basin. In collaboration with stakeholders from the agriculture, energy, tourism, water supply, and fisheries sectors – all of whom play their own important roles in securing local jobs and livelihoods – NEXUS Gains is advancing this effort. A write-shop of experts and a meta-analysis of the literature on basin-level interlinkages have refined the approach, supporting stakeholders to minimize trade-offs and negative impacts of uncoordinated water use.

Work Package 2:
Water productivity and integrated storage management

Mapping existing water stores; developing a water storage diagnostic tool; formulating fit-for-purpose water productivity decision support systems (DSSs); and conducting political economy analyses. Integrated storage solutions, as well as activities in other areas, can reduce the negative impacts of climate change-induced water variability and improve water productivity.

In places where rural livelihoods lack resilience to climate change and other environmental risks, water security is seldom achieved. This is why NEXUS Gains focuses its second work package on improvements to water productivity and storage: both have important resilience benefits, especially for rural people living in poverty. Better access to water and irrigation technology create livelihood opportunities through more secure, productive food systems and higher dry-season incomes. And keeping more water available, throughout the year for various economic uses creates additional opportunities and generates jobs.

MANAGED AQUIFER RECHARGE

NEXUS Gains supported the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in a project to manage aquifer recharge in Bundelkhand, central India, including through earth bunds constructed around fields. In depleted catchments as large as 250 ha, managed aquifer recharge has led to rapid rises in groundwater and the revival of many dry wells. Households who long ago abandoned their farming livelihoods in the region and moved away have now returned to the land. In the bunded fields crop yields rose by 300–500 kg/ha for different crops, resulting in 10–60 percent higher net incomes.

Hand-dug well with recovered water level, Bundelkhand region, Uttar Pradesh, India. Photo by Ashok Shukla.

Work Package 3:
Energizing food and water systems sustainably and inclusively

Co-developing scalable business and finance models for accelerated, inclusive access to clean energy in rural areas, focusing on women and other marginalized groups.

Nexus-oriented energy solutions improve living standards and, as such, reduce multidimensional poverty. NEXUS Gains therefore examines business and finance models that help smallholder farmers, and particularly rural women, access clean energy services and technologies, including solar-powered irrigation pumps. Access to these services and technologies has traditionally been constrained by intersectional social factors and gender-blind policies that lock out women and other marginalized groups. Removing the constraints and making affordable, efficient energy sources available to all can transform rural livelihoods, whether through powering agricultural productivity, enabling new jobs, or simply by putting a hot meal on the table.

COOKSTOVE CHOICES

The use of raw biomass for cooking energy is one of the indicators of multidimensional poverty. In countries like Ethiopia, it disproportionately affects the livelihood opportunities of women, who carry the daily burden of fuel collection. There are numerous types of improved cookstoves that all promise alternatives to this unpaid labor, as well as cleaner air for better respiratory health. But with adoption very uneven, it is important to understand what makes these stoves work for households – and that is what NEXUS Gains is doing with a study on intra-household decisions on cookstove choices and impacts on the welfare of women and girls. The study provides policy guidance for cookstove programs and education campaigns by drawing attention to who makes cookstove decisions within the household and why.

Work Package 4:
Strengthening WEFE nexus governance

Enhancing the governance of natural resources through more effective multistakeholder platforms and social learning interventions.

Governance in the WEFE nexus must include many stakeholders to secure the livelihoods of all and balance short-term production with a long-term end to poverty. For example, sustainably managing groundwater is essential to sustainable livelihoods, but many of the crops farmers conventionally grow consume more water than rain and groundwater can provide sustainably. Meanwhile, competition from other groundwater users and uses is growing. Groundwater is a mostly invisible common-pool resource, so coordinated governance of such transitions is essential. To build that kind of governance NEXUS Gains creates a close understanding of actors and institutions in the system, their behaviors, and the social learning strategies that can shift behaviors and systems. This can ensure that governance improves livelihoods.

Community participation in groundwater games. Photo by Richu Sanil.

GROUNDWATER GAMES

Groundwater games are an important way in which NEXUS Gains works directly with communities. For instance, in a crop-choice groundwater game farmers have the opportunity to make choices – first individually, and then collectively – about which crops they will grow. Through the game they can take into consideration the income they may generate from a crop, the impact of the crop's water needs on groundwater levels, and the risk over-extraction poses to the livelihoods of all participants. Follow-up work with crop budgeting tools allows farmers to identify crops that will provide the best incomes with the available water each year. This exercise empowers communities to make coordinated decisions about crops and groundwater use in the real world.

Work Package 5:
Developing capacity for WEFE actors, including emerging women leaders

Supporting capacity-strengthening efforts for improved WEFE nexus practices that target professionals working in ministries and local government organizations, the private sector, agricultural extension services, civil society, NGOs, and academia.

NEXUS Gains' work to strengthen capacity has produced a series of complete curricula that different training entities – from universities to government ministries to private companies – can use to build professional capacity. So far, most other emerging nexus approaches and training resources have had a narrow focus on resource efficiency and technocratic fixes. NEXUS Gains has taken a broader approach by focusing its curricula and its own training programs on the potential ways that resources and technologies can have impacts on different users. With these curricula, professionals and decision makers have space to reflect on whose livelihoods WEFE nexus innovations are actually serving. Incorporating marginalized and impoverished groups in both the analysis and in decision-making is essential. This requires building specific capacities that support engagement of marginalized groups, and which the initiative has worked to strengthen.

LEARNING MODULE WITH AN INCLUSION FOCUS

In creating curricula for WEFE actors – from students to practitioners to policymakers – NEXUS Gains emphasizes the importance of fostering poverty reduction, job creation, and sustainable livelihoods for a diverse range of stakeholders. One notable example is the learning module on Gender equity and social inclusion in the WEFE nexus, produced for Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ). This module guides designers, implementers, and monitors of WEFE initiatives on how to ensure their actions benefit the livelihoods of women and other marginalized groups and communities, especially those who rely on, yet face barriers in accessing, WEFE resources. It introduces key concepts such as the different types of livelihood assets within the sustainable livelihoods framework and the 'do-no-harm' principle aimed at preventing the impoverishment of too-often-overlooked groups.

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Suggested citation: CGIAR Initiative on NEXUS Gains. 2024. *Focus and impact on poverty reduction, livelihoods, and jobs*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Initiative on NEXUS Gains. 4p.

We would like to thank all funders who support this research through their contributions to the CGIAR Trust Fund: www.cgiar.org/funders

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