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POLICY BRIEF

A RURAL GREEN TRANSITION IN THE G5 SAHEL

Jobs for youth

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Key messages

- The transition to a green agrifood system could create more than 8 million additional, full-time jobs in the countries of the G5 Sahel by 2030.
- The countries of the G5 Sahel need to make a green transition in their agricultural and rural economies to counter climate change and make farming and herding more sustainable.
- Six areas of transition are already underway and are making a critical impact in greening the agrifood system: a transition to renewable rural energy, especially solar power; expanding small-scale irrigation; switching to climate-smart and environmentally sustainable agriculture; restoring common lands; creating fisheries; and recycling rural waste.
- In some activities, such as soil and water conservation, the Sahel is already a world leader. In others, such as solar power, the Sahel has the potential to lead the world.
- Much of the change needed does not depend on the state: private and collective efforts will drive change. The public role is to support and facilitate, not direct.
- Conservation of fields, pastures and commons in the rural Sahel generates benefits far beyond the villages: international finance should help pay for investments.


Solar panels on a farm, Mali. Photo: © Curt Carnemark/World Bank

This SPARC policy brief is based on the longer report, *Green jobs in agrifood systems: setting a vision for youth in the Sahel*, produced by the Food and Agriculture Organization of the United Nations (FAO) and ODI thanks to the contribution of the German Federal Ministry of Agriculture (BMEL) (Wiggins et al., 2023).

Introduction

Populations of the five countries of the G5 Sahel — Burkina Faso, Chad, Mali, Mauritania and Niger — are still growing rapidly, in Niger by as much as 3.7% a year. Most people are young. In the five years between 2022 and 2027, 11.4 million youth will turn 16 years old, when most will start to seek jobs. If young job-seekers do not find decent employment, they may emigrate or turn to crime and insurgency.

At the same time, G5 Sahel countries must transform their economies over the medium term to be environmentally sustainable, and especially to adapt to a changing climate. The countries must pass through a green transition.

Most people in the G5 Sahel live rurally, farming and herding. We thus ask, can a green transition in the rural and agricultural economy generate jobs for youth?

What we studied, how and when

Between September 2022 and January 2023, a team (two researchers from ODI and local partners in country) spoke to key informants in the G5 Sahel countries. We collected data and literature to establish the key elements of a rural green transition, and from this estimated what jobs might be created by such a transition.

What we discovered

We found six changes for a rural green transition, four with major potential to generate jobs.[1] Overall, these four areas have the potential to create almost 8.2 million additional, full-time jobs per year in the Sahel by 2030 (see Table 1).

TABLE 1. SUMMARY OF POTENTIAL EMPLOYMENT CREATION ACROSS THE G5 SAHEL COUNTRIES TO 2030

	Installation (000)	Installation annual equivalent over 7 years (000)	Operations and maintenance, annual (000)	Total annual employment (000)
Rural solar power	247	35	99	134
Irrigation				
▪ Farm work	5,700	814	1,140	1,954
▪ Technical support			3	3
Environmentally sustainable and climate-smart agriculture	3,200	457	560	1,017
Land restoration	5,181.5	740	2,431	3,171
Total		**2,046**	**4,233**	**6,279**
Apply multiplier (1.3)*				2,661
Grand total, annual				**8,163**

*The multiplier reflects the additional jobs that can be created as a result of employment in these key sectors.

Source: See Wiggins et al. (2023) for original table and full calculations.

1 The other two areas of change concern fisheries, both capture and aquaculture, and recycling of rural waste. Because they generate far fewer jobs than the other four changes, details of these are omitted in this brief, but can be found in the full report (Wiggins et al., 2023).

Rural solar power

Potential jobs per year by 2030: 134,000

Energy for rural areas will switch to renewable sources: hydroelectric plants where rivers permit, but above all from solar photovoltaic panels. The Sahel has enormous potential for solar power. The electricity generated will run household lights and appliances; it will drive irrigation pumps; it will power rural workshops. In the medium term, it could allow rural transport to be electrified. The G5 Sahel could become almost entirely self-sufficient in energy (AfDB, 2021; 2022; 2023; IEA, 2022).

Moves to renewables are already underway: some hydro plants are running, and solar panels are increasingly common in towns and villages.

Solar power may be generated by: village plants serving a mini-grid for the local area; individual household roof-mounted panels; and solar panel arrays for (irrigation and water) pumps. If half the 10 million rural households of the G5 Sahel use solar electricity by 2030, some 791 MW of capacity would need to be installed, at an estimated capital cost of US$8.1 billion (for typical costs, see GCF, 2019). Employment created would be almost 250,000 person-years for installation, and thereafter almost 100,000 persons per year to operate and maintain the plants.

Irrigation

Potential jobs per year by 2030: 1,954,000

Irrigation allows farmers to control water, reduces their dependence on variable rains, and helps them adapt to a changing climate. It increases the productivity of other farm inputs – fertiliser, seed and, above all, human labour. Irrigation can substantially increase crop yields and generate greater returns per hectare (Wiggins and Lankford, 2019).

And yet only a small share of the area to arable crops in the G5 Sahel countries is currently irrigated: 230,000 ha out of 36 million ha of arable land, just 14% of the estimated potential. As such, governments have declared their intention to expand irrigation. The Dakar Declaration of 2013 aimed for 800,000 ha by 2020 in the five countries, while another 570,000 ha may be developed in the 2020s (Sahel Irrigation Initiative, 2017).

But scale of irrigation matters. Large public sector schemes, such as the 100,000 ha *Office du Niger* in Mali, usually cost more to develop per hectare, and to be harder to maintain and operate, than small-scale schemes at farm and village level. Technical advances, above all solar-powered pumps, promise to facilitate the development of irrigation at small scale (Bazin et al., 2017; Inter-réseaux Développement rural, 2016; Sahel Irrigation Initiative, 2017; Wiggins and Lankford, 2019).

Irrigation usually greatly increases the demand for labour on fields. As a broad average, irrigation can create two more full-time equivalent jobs per hectare (Gross and Jaubert, 2019 on Burkina Faso; Namara et al., 2011 on northern Ghana). On this basis, irrigation of another 570,000 ha could generate 1.14 million jobs on the fields alone – not counting extra jobs in collecting, processing and transporting extra produce, and in providing inputs and services such as the repair of pumps to irrigators.

However, works and equipment typically cost around US$5,000 per hectare for small-scale schemes (Sahel Irrigation Initiative, 2017): consequently, the total investment for the expansion contemplated would amount to US$2.85 billion. For farmers to invest, they would need access to lines of credit.

A further consideration is the risk of over-abstraction of surface water or groundwater from expanded irrigation. To avoid this requires a collective effort at catchment and aquifer level to monitor water use and ration it if necessary. Given limited state capacity to manage such arrangements centrally, more localised arrangements may be needed, using community observations of river flows and water levels in wells.

Environmentally sustainable and climate-smart farming

Potential jobs per year by 2030: 1,017,000

Farming needs to become environmentally sustainable and climate-smart and to be adapted to a changing climate (FAO, 2015). In the Sahel, the priorities are to conserve soil and water, to avoid conversion of valued habitats to crop farming and to adapt systems to a climate expected to be much warmer, with more — and considerably more varied — rain (Holmes et al., 2022).

Since the 1980s, farmers in parts of the Sahel, especially in Burkina Faso and Niger, have been conserving their soil and water using stone bunds, semi-circular levees and zai pits: in large part local innovations. They have also been regenerating trees on their fields. These changes have taken place over millions of hectares, a success not as well recognised internationally as it deserves (Cotillon et al., 2021; Magrath, 2020; Reij and Winterbottom, 2015).

Conservation pays, through higher yields on treated fields and through avoided future degradation of soils: estimates of benefit–cost ratios range from 5:1

to 10:1, which are very high returns indeed (Reij and Winterbottom, 2015). Although large areas have been treated, considerable additional areas would benefit from conservation. If another quarter to one-third of the arable land were to be treated, this could create between 4.5 million and 5.9 million full-time equivalent jobs for construction and between 380,000 and 737,000 jobs in annual maintenance.

Much of this work is manual labour; ideally, it would be possible to mechanise the most arduous jobs, such as digging zai pits. In turn, that might create the potential for teams of youth to acquire the machinery through leasing and then to hire out their services to farmers.

Although many of the benefits of conservation accrue to famers, some positive externalities are created too, above all when carbon is captured in soils and trees. Farmers should be rewarded for this.

Land restoration

Potential jobs per year by 2030: 3,171,000

Land restoration closely complements the previous axis of transition, the difference being that restoration applies first and foremost to common lands rather than fields belonging to households. Landscapes across the Sahel have changed greatly over the past century: tree and shrub cover has been lost; and some (but far from all) fields have been overworked, leading to loss of soil and nutrients (Mirzabaev et al., 2022; Cotillon et al., 2021).

Governments in the Sahel, and the international bodies that work with them, recognise land degradation to be serious and have resolved to remedy it (Reij et al., 2020). Among the international initiatives are the Bonn Challenge to restore degraded and deforested lands, the African Forest Landscape Restoration, which supports the African Union Agenda 2063 and, the most eye-catching and best known of these initiatives, the Great Green Wall (GGW), which spans the Sahel (FAO, 2016). These fit within the United Nations Decade on Ecosystem Restoration (2021–2030).

To restore and enhance the commons, vegetation needs encouragement: by first conserving soils and water, then either by planting trees or (preferably) by allowing seeds from native trees to regenerate.

Two visions of how to do this compete. One vision sets national targets for restoration and reforestation then implements through central agencies, using local people as casual labour. This top-down approach too often disempowers and alienates locals, so measures taken are not maintained: typically, many trees planted do not survive. The alternative vision is to start locally, giving more power and agency to villages and communes to undertake the measures they would like to see for their commons. Strong arguments support a decentralised approach. Ideas for the GGW have changed from early conceptions of the wall as engineering a forest barrier no more than a few kilometres wide, to the wall becoming a metaphor for enhancing landscapes across a much broader swathe of landscape (Botoni et al., 2010; FAO, 2016; Flintan et al., 2020; Reij and Winterbottom, 2015).

The value of restoration lies: partly in the value of higher yields for crops in agroforestry fields, in forest products such as wood, fruit, etc.; partly in enhanced functioning of the ecosystem; and partly in avoiding the considerable costs of land degradation — estimated to cost Niger US$30 billion over 30 years. Benefit–cost ratios for restoring land are high: from 2.5:1 for restoring woodland to more than 6:1 for cropland and more than 7:1 for wetlands (Nkonya et al., 2016).

National targets for land restoration are ambitious: Mali would like to regenerate and reforest 5 million ha, restore degraded land and consolidate sand dunes over 3 million ha. By 2030, Niger has targeted planting up and restoring forests on 2.8 million ha, managing another 2 million ha of forests, encouraging agroforestry on 1 million ha of croplands and restoring 1.5 million ha of degraded land.

For Niger, an estimate of the total full-time jobs created to establish and plant to the targets set comes to just over one million jobs over the seven years to 2030: an annual average of 150,000 full-time equivalent jobs, plus annual maintenance work of 486,000 jobs, amounting to 636,000 jobs a year in all. If Niger's ambitions were replicated over the other four countries, then as many as 3.18 million jobs a year would be created across the G5 Sahel.

While land restoration may already be policy across the G5 Sahel, implementing it requires both capital and organisation. Investment costs for Niger are estimated at US$2.1 billion, or US$301 million per year over seven years, plus US$1.2 billion in annual maintenance. Unless international funds are more forthcoming, this may well be beyond the means of the Nigerien government.

The organisational challenge is no less formidable: to plan and implement works across millions of hectares requires many field workers. Moreover, land rights are critical to land restoration. Local people will restore their fields and commons only if they feel that these are their lands, from which they reap benefits and over which they can set rules on usage – for example, how much firewood members of the community can remove from local forests, how much stock can be grazed on the commons, and how those livestock are to be controlled to prevent damage to fields. Added to this are the rights of nomadic and transhumant pastoralists to move their

livestock seasonally, for which they need agreed routes and rules. Without agreement, conflicts between farmers and herders can break out.

Indeed, in parts of the Sahel, rights to common lands are not well defined. Overlapping norms are set by different jurisdictions, from the central government to communes to village councils. Arriving at a fair consensus on land rights requires discussion and negotiation among those with longstanding claims. This may not be simple, but it can be done, as field experience from Burkina Faso and Niger demonstrates (Reij et al., 2020). Care and patience with rights, preferably with devolution of powers to local forums, can be allied with land restoration to reduce the menace of violence. This is quite some prize, one that helps justify the costs of land restoration, if additional justification were needed.

Calculating potential job opportunities created by the green transition in the Sahel

When employment and income are created in primary sectors, this will lead to multipliers in the rural economy. For example, pumps and solar panels create a demand for technicians to repair and maintain equipment; additional farm output creates jobs in trading, processing and transport; extra income spent locally generates demand for services, such as construction and catering. To reflect this, we have applied a multiplier to jobs of 1.3, taking values reported in the literature (Haggblade et al., 2007).

Summing the potential employment estimated for the four main axes of transition, it may be possible to create 8.2 million (full-time equivalent) jobs in investments and installation and in operations and maintenance in annual terms, including another 30% for jobs created rurally through multipliers (see Table 1).

This can be compared against the projected entry of 11.4 million new entrants to the labour force over five years and 24.8 million over 10 years. In sum, a rural green transition could make a large contribution to meeting the demand for work.

What it means for policy-makers

1. **Most of the changes needed are already underway:** in no case does the green transition depend on radically new activity requiring skills and competencies scarce in the Sahel. The need is not to start a new thing, but to accelerate what is, in some places, already taking place.
2. **For some activities, the people of the G5 Sahel countries are already leaders in innovation**, even if this is not widely known. In seeking guidance and expertise to take such measures forwards, learning from the best and most innovative famers and learning from local leaders should provide technical lessons and inspiration.
3. In yet other activities, **the Sahel has the potential to lead the world** — above all with solar energy.
4. **Many of the changes require neither central direction by the state nor large-scale public funding** — with one notable exception. Key drivers of change will be demand from rural households accompanied by firms seeking business and profit, solar energy and irrigation being excellent examples. Rather than trying to drive (or control) such change, the state needs to accompany, monitor and nurture it, acting where it needs to act: to foster collective action and to provide public goods.
5. **The funding exception concerns land restoration**, where the value of improvements partly accrues as public goods and externalities whose benefits reach well beyond the field or village boundary — biodiversity and carbon capture being global public goods. These benefits also persist well beyond the usual horizon of five or so years for business planning. A strong case can be made for public investment in these activities. Given that some benefits are international, they should be funded in considerable part by global agencies and funds.

Considerations

The transition to environmentally sustainable agrifood systems has the potential to create a large number of jobs for people in the countries of the G5 Sahel. This is particularly critical for young people, who make up a large and increasing proportion of the population.

While 8.2 million new full-time jobs is an impressive number, for these opportunities to help solve the employment problems in the G5 Sahel they must be adequately paid and accessible to a large number of people. With this in mind, there are a few questions:

1. Will these jobs be accessible for youth?

Of the 8.2 million jobs, the great majority will involve work on the land, in the fields, on the commons. The skills needed are largely those familiar to anyone raised on a farm, in a village. That said, these skills are largely tacit skills that older generations need to pass down to youth. Youth may discount such knowledge as something from a bygone age.

Some jobs will require technical skills. For solar energy, technicians need to know (some of) the science that lies behind the technology; they need instruction in the practical skills necessary to install and maintain the panels. To back up an expansion of irrigation, to support farmers conserving and enhancing their land, and to accompany local groups working to restore their local landscapes, more extensionists will be needed. In addition to training in agronomy, ecology and forestry, such technicians need orientation on working with people to facilitate processes — for example to chair farmer field schools — rather than to instruct farmers by rote learning.

2. Will these jobs be accessible to young women?

Only a few jobs will call for unusual physical strength. That said, many of the activities will be seen as men's work because, variously, they call for strength, they entail physical hazards or they involve skills — such as electrical or mechanical abilities — that traditionally have been male preserves. Few of the jobs will be seen as roles for women, the exceptions being unenviable tasks such as weeding fields or laboriously pricking out tree seedlings.

Overcoming rigid conceptions of jobs partitioned by gender may require a medium-term effort, as women demonstrate their competence in jobs considered to be for men. To ensure women get the chance to show their ability, quotas could be applied to training and hiring solar technicians and extensionists: half of the places on courses should be for women.

3. Will these jobs be well paid and attractive to youth?

Most of the jobs on the land will not be well paid; some youth will disdain them for low pay, for keeping them in the village and for being associated with farm labour, which has long been hard (and sometimes dirty) work. The technical jobs, rather than jobs on the land, are those that will probably attract ambitious rural youth.

That said, two closely related things need to be borne in mind. One is that farm wages have been rising in parts of the world where economic growth has been relatively strong over the past 40 years – as has been seen in East and Southeast Asia. The other is that, as labour supply becomes short, jobs on the land become mechanised — a process facilitated by Asian industrialisation reducing the real costs of machinery for farms and villages. Inexpensive pumps, cultivators and motorcycles are commonplace today in rural Africa. Many of these green jobs may initially require manual effort for low pay but with time – assuming sustained economic growth – wages will rise, and machinery will increasingly be used to ease the work.

4. Will these jobs be accessible to youth living with disability?

Most of the employment considered here requires being physically able: work on the land is not well suited to people with restricted mobility. Their prospects for employment will lie more with jobs created through multipliers, in services demanded by farmers and fishers with more income from their activities.

What can policy-makers do to support the green transition?

Transitions can look daunting to leaders facing the pressing demands of everyday business. In this case, however, some straightforward actions can drive change.

By Ministers in the G5 Sahel

First, **because some changes are already underway**, driven by individuals, households, farms and firms, **consult with those in the vanguard of change**. Consulting leaders, managers and others who are already making the changes, to gain their thoughts on matters critical to public policy, may well be more productive than commissioning further studies or drawing up comprehensive plans that add only minor detail, and only after some time, to what is already known.

Some of what is needed may not require costly or difficult state action: it may instead just need some obstacle to be removed — for example, exempting green inputs from a tax, cancelling a subsidy or deleting some not-so-necessary regulation.

Second, **some changes require only making progress on existing priorities**. For example, farmers wanting to irrigate need access to capital. Efforts to improve rural finance are longstanding: encouraging formal savings, lubricating credit and overcoming the market failures that separate deserving farmers from the small loans they need. New action may not be needed: taking stock then refining existing efforts may suffice. The next step may be quite small. For example, when farmers need credit for equipment, leasing becomes possible: it is far easier for a bank to fund leasing by a few formal suppliers than to advance credits in small amounts to a multitude of farmers.

To promote solar energy, work with industry — with importers or sellers of equipment — to deal with any bottlenecks and blockages. Supply chain forums that bring together importers, installers, electricity companies and representatives of consumers with government can be a way to identify problems and opportunities, to discuss potential solutions.

Decentralise any public spending on land restoration as far as possible: instead of spending through central ministries, give more to communes, empower them to take decisions and provide technical support — so they can devise what needs to be done locally to restore local landscapes, with all the adaptations to context this entails. In the 2010s, trials of decentralised climate finance were undertaken in Mali and Senegal that showed this could be done. Decentralisation may produce disparate local practice, and sometimes will lead to failure. But it may equally lead to unexpected successes — hence the next and final recommendation.

Ministers for agriculture and forestry should **reorient existing extension staff in agriculture and forestry agencies towards greener practices and towards working alongside farmers**. If necessary, get them to take pride in local innovations, recognising the considerable achievements of Sahelian farmers in pioneering ways to conserve soil and water.

By aid partners

Where **international public goods** are being created, aid partners should look to have the Green Climate Fund and other vertical funds finance such activities. In particular, it should be a prime goal to **obtain carbon payments** for farmers who capture carbon, even if this may take some years to achieve. It is unlikely any one government will be able to make sufficient progress on this: instead, form networks and working commissions across Africa to combine ideas and to put pressure on donors and international funds to take action. Within Africa there are centres of thinking that can take this forward – Akademiya, Alliance for a Green Revolution in Africa, the Forum for Agricultural Research in Africa, the Consultative Group for International Agricultural Research centres, the United Nations Environment Programme, etc.

Some tasks that may be needed to forge the link between the funds and actions on farms and villages may be attractive jobs for youth. For example, advising farmers and village councils on how they may qualify for payments; helping source any technical help they need; and monitoring, verifying and reporting on what has been done in the field. Such jobs could be rewarding for youth determined to lead in the fight against global heating.

If farmers and communities can be paid for their services on behalf of their nations, their region and the world as a whole, apart from the financial reward this should promote pride in Sahelian achievements — which deserve more appreciation across Africa and beyond. The combination of payments with pride may inspire local youth to value the knowledge and innovations of older generations, and make them interested to follow in their footsteps, where possible building upon and improving what their parents and grandparents have achieved.

By researchers

Looking locally for innovation does not, and should not, lead to ignoring formal science. Important advances have been made in recent times using sophisticated technology to understand natural resources in the Sahel — in detecting land use change through remote sensing, in assessing groundwater supplies through magnetic resonance soundings, in understanding teleconnections in regional climates for much-improved weather forecasting. The insights from these advances need to be brought together with understandings at field level: a role exists for **local and regional think-tanks to broker the two domains of knowledge** – and to steer the scientists towards addressing priorities seen from below, to prompt them to ask better, more productive, questions.

By research funders

Investments are needed in monitoring change in rural areas, reviewing what is changing, why and how. Funders should look for innovations being tried in the field to find better ways of working, with even greater benefits. The ingenuity and drive of some local actors should not be underestimated or ignored: they are a key asset in making the green transition.

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