

CHAPTER 9

Land and natural resources



Summary

Land and natural resources (primarily forests and water) play critical roles in economic and rural transformation. As populations and economies grow, the first natural response is to expand cultivation into former forests and rangelands and use the most readily available water sources in agriculture and the urban sectors. At that stage of development, customary and local institutions are usually adequate to allocate resources and manage conflicts between uses and users.

Over time, areas with the densest populations and best access to expanding urban markets are the first to encounter constraints on available land and experience declining yields, degrading water and forests, and rising resource conflicts among competing uses. Innovative farmers in those settings use new technologies and external inputs to intensify production and reverse degradation, if they have secure rights to their land. Markets for land rental or sale and new institutions for water, rangeland and forest management may develop spontaneously or through explicit government action. These processes have the potential to lead to sustainable, resilient and inclusive transformation – or to continued degradation, growing inequality of distribution and procedure, dispossession of the poor and vulnerable, and armed conflict.

Of the three resources, land is most important as an input into agriculture and can be held as individual or group property. Forests produce the widest array of products, from high-value timber for export markets to a wide variety of subsistence products and ecosystem services. Water is important in all sectors and populations, and has the strongest public good characteristics. Agriculture, forestry and livestock grazing are substitute land uses during different stages of transformation: forestry gives way to agriculture in the early stages and forestry becomes more important in the later stages, as forest ecosystem services become more highly valued and as rural populations start to decline. Forests are also natural sources of social protection, particularly for the poorest members of society.

As they unfold, transformation pathways create high risks to inclusion and to sustainable resource use. These risks can lead to scarcity, degradation, conflict, social action and inequalities of access and control over resources. Such outcomes signal the need for more formalized institutions and deliberate policy action.

The chapter focuses on these three resources in developing countries because of their importance to structural and rural transformations and to the livelihoods of rural communities, and smallholder farmers in particular. These resources are all subject to ongoing changes in scarcity, inequality of access and rights, and new governance alliances focused on improving sustainability and inclusiveness. The two transformations require – and by turns induce – deep changes in patterns of land and natural resource use between individuals and groups with different objectives and capacities, including different rights to initial capital, decision-making authority, bargaining power, access to local and national markets, and access to governance systems. These patterns differ across resources, raising distinct challenges, to which individuals, communities, local authorities, national governments and international bodies have responded in different ways. Civil society, too, has been crucial in fostering collective forms of resource governance as well as social movements among members of vulnerable groups.

Large areas of land have seen sustainable intensification of agricultural production based on the introduction or promotion of new species and varieties of crops and livestock, agronomic and rangeland improvement, agroforestry, soil conservation, conservation agriculture, integrated pest management, horticulture, fodder crops and aquaculture. Consequently, farming systems have become more diversified, soils are more productive, chemical inputs are used less, and soil and water pollution has declined.

About half the countries in the world are engaging in some form of land tenure reform, and almost 1 billion farmers have already benefited from those reforms. Many countries have recently adopted tenure reforms that

recognize a continuum of property rights and tenure insecurity, with some specifically strengthening the land rights of women and minority ethnic groups. Underlying all successful programmes have been major investments in the infrastructure of land registration, including cadastral surveys, computerized records, training in legal rights and resolution of land disputes. One of the main responses to the rapid rise of large-scale land investment has been in assessments, guidelines and codes of conduct by multilateral organizations and bilateral development agencies, to guide governments of target countries and investors.

For forests, designation of protected areas, devolution of forest management, and greater use of agroforestry have been the main responses to the challenges of deforestation, forest degradation and increasing scarcity of forest goods and services.

In more detail, the amount of forest area designated for biodiversity conservation increased in all regions in 1990-2015, with the largest areas now found in South America, Asia, Europe, North and Central America, Africa and Oceania (in that order). Thirteen per cent of the world's forest area has now been designated for conservation. Co-management, as well as joint, community and decentralized management of forests, as well as payments for ecosystem services, have been pursued as alternatives for balancing the public benefits of protection with the private benefits of production. The advent of REDD+ (Reduced Emissions from Forest Degradation and Deforestation) under the United Nations Framework Convention on Climate Change has created new international interest in the ecosystem services of tropical forests, particularly their carbon storage, carbon sequestration and climate change adaptation characteristics. Some progress has been made in implementing REDD+, with over 200 REDD+ demonstration projects launched in over 40 countries and government-led REDD+ programmes developed in several countries and regions.

The focus of water resource development has shifted from expanding large infrastructure to water demand management, water use efficiency

and improving water governance. With a few notable exceptions, construction of large-scale dams has slowed, even if concerns about the impacts of carbon-based fuels on climate change are contributing to new interest in dams for hydropower generation. However, new concerns are emerging over the impacts of reservoirs and loss of water for downstream communities.

Ecosystem management is advocated as important for more efficiently and sustainably managing water resources. Increasingly important is integrated water resource management involving managing water at the basin or watershed level, optimizing supply from surface and groundwater supplies, managing demand through cost recovery and decentralized management, providing equitable access through user organizations and involvement of women and marginalized groups, establishing policies such as the 'polluter-pay' policy and water regulations, and intersectoral approaches to decision-making that vest authority with those who have a stake in the process.

On cross-cutting aspects, transformation processes tend to exaggerate initial differences in natural resource access and control between groups. Without attention, these differences can lead to new forms of impoverishment, food insecurity and social conflict.

Reforms of land, water and forest tenure can help to mitigate the differences. Land reforms are undertaken to address social conflicts, growing inequality or persistent biases against women, indigenous peoples or other cultural-defined groups. Governance is thus critical for the sustainability and inclusiveness of transformation pathways: customary and indigenous systems can be effective and inclusive where they are recognized as legitimate, empowered to deal with external threats and held accountable to statutory laws and international principles. Statutory systems need to monitor and respond to internal and external pressures, ensuring that resource users have incentive to invest in and conserve resources, and manage spillover effects.

Markets can promote efficient use and equitable access to resources, but should be transparent and ensure consistency with social

goals and fundamental rights. Collective action and social movements can be important for governing common resources and providing access to public decision-making processes. All three natural resources have been the subject of multistakeholder dialogues to develop new standards, codes of conduct and guidelines for responsible governance. Some of those standards have been codified in international treaties and national laws, but need to be implemented well and enforced strongly. The initiatives lack, however, special consideration for gender equality and women's rights. International agencies and donors can help develop capacity of governments, civil society and the private sector to support enhanced and sustained implementation.

Procedural and distributional inclusiveness

Crop yields on current cultivated land would need to increase at an annual 2.4 per cent to meet the needs of the roughly 9 billion people who will inhabit our planet in 2050.

Given current annual yield growth of only 0.9-1.6 per cent for the world's major food crops, the world is almost certain to experience increased pressure on land and other natural resources over the next three decades (Ray et al. 2013). Unless addressed, these pressures could lead to greater inequities, conflict, poverty, hunger, reduced resilience and environmental damage.¹²⁶

Since 2007-2012 when food prices rose and became more variable over time, and the impacts of climate change on food supplies became clearer, demand for land and other natural resources has seen dramatic increases, particularly in developing countries. Media headlines of "land grabs," "ocean grabs" and "water wars" reflect heightened global concern over the governance of land and other natural resources. Large-scale foreign investment in developing countries is a particular concern.

Behind the drama is the process of economic structural transformation, which features deep changes in access to and use of natural resources on which most rural livelihoods are based, especially those of smallholder farmers. The

key issues are encapsulated in four questions: what are the major trends in use and access to key natural resources? Which challenges linked to structural and rural transformations are emerging, and why? What are the major responses to these challenges, and what are their impacts? And, which policies and investments can enhance positive impacts and mitigate negative effects?

A core argument used in addressing these questions is that one of the best ways to promote inclusive and sustainable transformations is to include procedural and distributional inclusivity in those changes. Five propositions on land and natural resources in transformation underpin the argument that:

- The use, management and investment in land and natural resources are codetermined with the trajectory and inclusiveness of structural and rural transformations.
- The way that land and natural resources are governed shapes resource use, technologies and the trajectory and inclusiveness of transformation.
- Entrenched social groups may perceive real benefits from current patterns of land and natural resource access and use, and act to deter more inclusive processes.
- Institutions that govern land and natural resources can change due to long-term, evolutionary processes and to radical policy initiatives.
- External agencies can play key roles in inclusive transformation by promoting international best practice and by responding to policy opportunities that open in certain countries.

This chapter discusses impacts of governance processes on marginalized and vulnerable groups, along with how deliberate actions by governments, firms and civil society have created new opportunities for these groups. It looks particularly closely at minority and indigenous ethnic groups, local communities and women. Its focus is on three resources especially important to developing countries' structural transformation, and to smallholder farmers in particular – land, forests and fresh water –

because of their importance to transformation processes and to the livelihoods of rural communities. These resources are all subject to ongoing changes in scarcity, inequality of access and rights, and new governance alliances focused on improving sustainability and inclusiveness.

The three resources are crucial in economic and rural transformation. Land is most important as an input into agriculture and can be held as individual or group property. Forests produce the widest array of products, from high-value timber for export markets to a wide variety of subsistence products and ecosystem services. Water is important in all sectors and populations, and has the strongest public good characteristics.

Agriculture, forestry and livestock grazing are substitute land uses during the different stages of transformation, with forestry giving way to agriculture in the early stages and forestry becoming more important in the later stages as forest ecosystem services become more highly valued and as rural populations start to decline. Forests are also natural sources of social protection, particularly for the poorest members of society.

Inequalities in land and natural resources are important to the processes of transformation for many reasons. As productive assets, natural resource inequalities can mean that agents with endowments of other inputs – labour, skills, capital – cannot be fully productive. Perhaps more important, inequality in resources often translates into inequality in access to political power, which maintains the status quo at the expense of investments in economic diversification and education. Land inequality in particular can translate directly into lack of inclusivity. Also very important and subject to many of the same pressures are genetic resources, rangelands, fisheries and minerals (box 9.1).

The next section considers past and likely future trends and patterns in access to land, forest, and water resources across the globe, with a particular focus on equality (or lack of), followed by a review of responses to them. Impacts of these responses are then considered.

Trends, patterns and challenges

Structural and rural transformations require – and in turn induce – deep changes in patterns of land and natural resource use between individuals and groups with different objectives and capacities, including different rights to initial capital, decision-making authority, bargaining power and access to local and national markets and to governance systems. These patterns differ across resources, raising distinct challenges.

Land

One of the most pressing and persistent needs facing developing countries is for institutions and technologies to support sustainable intensification of agriculture – producing more output per unit of land area while reducing negative environmental impacts and maintaining future production capacity (Reardon et al. 1999; Otsuka and Place 2014; and box 9.2). A few Asian countries have already reached, or are soon to reach, the turning point at which their rural population begins to decline, but African countries will continue to have growing rural populations for decades to come. Some parts of Africa have relatively low population densities, but other parts already have extremely high rural population densities, including the East African highlands, most of Nigeria, and the Lake Victoria area (Jayne et al. 2014b). New technologies and institutions are needed to accommodate these growing rural populations without worsening the problems of soil erosion, depletion of soil organic matter and water pollution.

Worldwide during 1960-2000, most high-income countries saw increases in average farm size, while most low- and middle-income countries experienced decreases (table 9.1). With agricultural land area relatively fixed, these changes equated to reductions in rural populations in high-income countries and increases in rural populations in low- and middle-income countries. Average farm sizes vary greatly across regions: 1.0 hectare in East Asia; 1.4-2.4 hectares in South Asia, South-East Asia

BOX 9.1 Genetic resources, rangelands, fisheries and minerals

Genetic resources. Public policy concerns in this area tend to focus on conservation (ex situ and in situ), sustainable use and benefit sharing. Genetic improvement of food crops and domesticated animals has long been a key source of food production increase, although techniques like trans-genetics are still hotly contested (McIntyre et al. 2009). Genetic resources of all kinds are the focus of the United Nations Convention on Biological Diversity (including the Cartagena Protocol on Biosafety and the Nagoya Protocol on Access and Benefit-sharing – table 9.6), while plant genetic resources used for food and agriculture are the focus of the International Treaty on Plant Genetic Resources for Food and Agriculture. More information about plant genetic resources is available in the State of the World's Plant Genetic Resources (FAO Commission on Genetic Resources for Food and Agriculture 2010).

Rangelands. It may appear ironic that rangelands in most regions of the world are contracting and degrading at the same time as demand for livestock products continues to increase in response to growth of populations and per capita incomes. Across Africa, North Africa, the Middle East, Central Asia, Central America and the Andes, pastoral production systems are contracting in response to expansion of large-scale commercial crop and mixed-farming systems. Intensive systems that integrate crops, livestock and trees are meeting the increasing demand in most regions, while cattle and sheep ranching are expanding into former forests in the South American lowlands.

Rangeland degradation is a common problem, even though many countries have established “national action plans” to combat desertification, with major emphasis on rangelands. The traditional systems that govern pastoral production are under internal pressure to accommodate more settled agriculture and external pressure to respond to more stringent marketing regulations and to accommodate large-scale agriculture. Conflicts involving pastoral groups are an unfortunate but avoidable consequence of such pressures (Herrera et al. 2014).

Fisheries. The world's fisheries are changing fast. At the global level, production from inland and marine capture fisheries has stabilized at about 85-90 million tons a year since 1995. Aquaculture production in contrast increased at an annual 6 per cent between 2002 and 2012, and will soon exceed production from capture fisheries. (Fish consumption per capita is higher in Asia than any other region.) Policies and institutions that govern aquaculture focus on sharing land and water resources, managing spillover effects between aquaculture and other land uses of land and water, managing invasive species and ensuring food safety (FAO Commission on Genetic Resources for Food and Agriculture 2010).

Minerals. Over the past decade, high commodity prices have fuelled a global expansion of mining and mineral extraction. Both artisanal and small-scale mining (ASM) and large-scale mining are common in developing countries. The estimated number of ASM miners is 180,000-200,000 in Ghana (50 per cent women), 109,000 in Indonesia (10 per cent women) and 30,000 in Peru (female share unknown). ASM is an important livelihood strategy for over 100 million people globally and is growing faster than large-scale mining (Eftimie et al. 2012; Buxton 2013).

Extractive industries pose inherent challenges for governance. Long investment cycles and high costs of physical infrastructure require secure long-term rights and, because governments usually classify minerals as public resources, mineral rights need to be negotiated between mining companies and governments. Mine operations also require land and water, which may be held under private or group tenure, with governance devolved to local arms of government or to customary institutions.

Sources: McIntyre et al. 2009; FAO Commission on Genetic Resources for Food and Agriculture 2010; Eftimie et al. 2012; Buxton 2013; Herrera et al. 2014.

BOX 9.2 Structural transformation, natural resource governance and inclusivity – land

In countries with abundant land and rural labour, increased food demand from population growth is largely accommodated by expanding agricultural production into more remote areas. Investment of labour in land clearing is an investment that creates temporary use rights that are protected by customary authorities. With low pressure from local or external populations and plentiful land supplies, land can often be administered effectively by local or customary authorities.

Over time, there is a gradual reduction in the amount of uncultivated land. With no change in land management, continued rural population growth causes land farm sizes to decrease, fallow periods to decline and soils to degrade. With this land scarcity and threat to sustainability, farmers have an incentive to increase production by intensifying land use through more labour-intensive methods, purchased inputs and land improvements to produce a more diverse set of outputs. Irrigation, tree planting and soil conservation structures can increase both production and conserve resources.

Whether this incentive translates into real investments and intensification, however, depends on land governance institutions, technology to hand and market access. Farmers will seek more secure individual land rights either through institutions or external interventions. The most innovative and commercially oriented farmers will be the first to vie for certificates, titles or other indicators of tenure security. At higher levels of land pressure, farmers will seek still more secure forms of tenure, and formal or informal markets will develop (purchase or rental). Recent reforms have introduced and applied the concept of a continuum of property rights – that is, there may be ways to enhance the security of customary rights and governments may support more or less complete forms of statutory rights.

Sources: Baldwin et al. 2014; IFAD 2015.

and SSA; 4.9 hectares in West Asia and North Africa; 10.7 in Central America; 32.3 hectares in Europe; 111.7 hectares in South America; and 178.4 hectares in the United States (Wegner and Zwart 2011).

Many analysts trace the evolution of use, management, tenure and inequality in land to three historical periods: pre-colonial, colonial and post-colonial (Binswanger et al. 1995; Deininger 1995, 1997). In countries like El Salvador, Guatemala, South Africa, India, the Philippines and Zimbabwe, colonial settlement created massive inequalities in land ownership, especially where large plantations operated with cheap local labour. Dual systems of land administration were put in place in many places, with large-scale commercial agriculture administered through statutory institutions and smallholder subsistence-oriented agriculture by customary authorities (box 9.2). Dual

land tenure is but one of several cases of land inequality (table 9.2).

Countries and regions differ greatly in the degree of inequality of land ownership. Based on land-ownership Gini coefficients in 111 countries, the highest inequality a decade or so ago was in South America (mean Gini coefficient of 79.9), followed by Central America (72.3), Caribbean (68.1), North Africa and Middle East (65.1), Western offshoots (Australia, Canada, New Zealand and the US) (64.5), Western Europe (63.9), South and East Africa (62.7), South Asia (53.7), Scandinavia (51.0), Eastern Europe (49.3), South-East Asia (47.9), West and Central Africa (45.2) and East Asia (38.4) (Frankema 2006).

Empirical studies have identified ways in which land inequality can affect the pace of economic transformation: reduced investment in education, lower efficiency of input markets, less development of industries that rely on

TABLE 9.1 Number of countries exhibiting a decrease or increase in the average size of agricultural holdings, 1960-2000

Country/region	Decrease	Increase	Neither clear increase nor decrease
High-income countries	6	25	4
Low- and middle-income countries by income group			
Low-income countries	12	2	1
Lower-middle-income countries	24	2	0
Upper-middle-income countries	19	5	1
Low- and middle-income countries by regional group			
East Asia and the Pacific	9	1	0
Latin America and the Caribbean	18	7	2
Middle East and North Africa	10	0	0
South Asia	5	0	0
Sub-Saharan Africa	15	3	1

Source: Lowder et al. 2014, p.9.

TABLE 9.2 Causes and implications of land inequality

Cause of inequality/non-inclusiveness	Examples	Implications for inclusiveness of transformation	References
Colonialism created a dual system of large plantations vs. subsistence agriculture	El Salvador, Guatemala, South Africa, Zimbabwe, Malawi, Brazil	Dualistic rural economies reduce provision of public services to smallholders, lowering productivity growth, slowing labour movement to industry and reducing inclusivity.	Binswanger et al. 1993; Banerjee and Iyer 2005; Kourtellos et al. 2013a
Culturally defined groups	Scheduled Castes and Scheduled Tribes of India	Greatest conflict and lowest education in districts with high land inequality, poorest soil and highest share of Scheduled Tribes. Both reduce development and inclusivity.	Gomes 2015
Long-term residents versus recent immigrants	Cocoa area of Côte d'Ivoire	Immigrants have experienced social exclusion and tension, contributing to civil war and a long delay in transformation.	Mitchell 2011
Ethnic groups in remote, international boundary areas	Hill tribes of Thailand (Karen, Hmong)	Hill tribes have been excluded from benefits of Thai citizenship. Community forestry has been promoted and accepted as a way to strengthen their forestry and citizen rights.	Van der Geest 2003
Gender	Women in many parts of the world	Women may be systematically disadvantaged in all elements of transformation, and left in low-return rural employment.	Archambault and Zoomers 2015

external finance, higher tariffs and greater social conflict.¹²⁷ Box 9.3 presents two propositions about the links between land inequality, conflict and transformation.

The last decade has seen a rapid increase in foreign investment in land in developing countries. These investments seem to have been driven by many factors, including concerns about future food prices and food security in investor countries, recognition of the growing demands for food in Africa, and biofuel mandates that countries around the world instituted during 2005-2009. As discussed by Deininger and Byerlee (2011), most of the top target countries have relatively low population densities and land governance systems that provide relatively weak tenure security and low recognition of customary tenure.¹²⁸ These investments can disrupt existing land use and livelihood systems, particularly where the authority of customary tenure systems are not recognized by statutory law.

Simultaneously, some African countries such as Ghana, Kenya, Malawi and Zambia saw increased investment by urban residents in medium-sized farms. As with many large investments, these medium-scale investors tend to cultivate low shares of their land. In Zambia, Jayne et al. (2014a) found that, on average, farms of 0-2 hectares cultivated 91 per cent of their landholdings, farms of 5-10 hectares 50 per cent and farms of 20-100 hectares only 11 per cent. In Malawi, these farms originated both from growth of smaller farms and absorption of smaller into medium-sized farms (Anseeuw et al. 2016). There is therefore a valid concern that the growth of the cohort of medium-sized farms will occur at the expense of small, subsistence-oriented farms.

These changes in international and national investment in rural land are a double-edged sword. At best, the investments bring in much-needed inputs, infrastructure, technology, markets and extension services to small and large farms in isolated and sparsely populated areas. At worst, the investments displace large numbers of smallholder farmers and diminish both primary and secondary land rights of groups already politically and economically

marginalized, thus deepening vertical inequality and potential for conflict, and diverting investment and policy attention away from smallholder farmers and the value chains on which they rely (De Schutter 2011).

Forests

Forests perform four main roles in transformation: production of raw materials – timber, fuelwood, gathered foods, medicinal plants and housing materials – used in agriculture, industry and domestic life; clearance for agricultural expansion and soil fertility management during the early periods; production of ecosystem services of value to expanding industrial and service sectors such as biodiversity conservation and regulation of water cycles and the climate; and provision of subsistence food and cash income for people excluded from the benefits of transformation.¹²⁹

Forests provide full-time employment for few people but meaningful livelihood benefits for many. FAO (2014) estimates that the global forest sector employs only 13.2 million people in the formal sector and 41 million informally, forest products make a valuable contribution to sheltering at least 1.3 billion people, 2.4 billion people cook with wood or wood-fuel and 2.8 billion people use traditional medicines, mainly gathered in forests. Men hold most of the full-time jobs, and women are the main gatherers of non-timber forest products.

Forests contribute a larger share of income in poorer countries, primarily in the informal sector and for the most vulnerable (FAO 2014). In a comparative study of environmental income in forest-frontier areas in 24 developing countries, Angelsen et al. (2014) found that forest income accounted for an average of 22 per cent of total household income across all income groups. Relatively wealthy people earned more income from forests than poorer people in absolute terms, while poorer people tended to earn a higher proportion of their income from forests. Schaafsma et al. (2014) found similar findings in a study of the Eastern Arc Mountains of Tanzania.

Long-term trends of conversion of land from forest to agriculture, stabilization of forest cover and reforestation/afforestation

BOX 9.3 Links between land inequality, conflict and transformation – two propositions

The first proposition is that, everything else equal, locations with greater inequality in resource benefits tend to be subject to greater social conflict and slower economic transformation. The second is that areas that have suffered conflict over land inequalities often implement land reforms during the post-conflict period. We support the proposition with an appeal to theoretical literature as well as to evidence from Paraguay, Colombia, Brazil and India.

The case of Paraguay, which now has one of the most unequal land distributions in the world, suggests that a dualistic agrarian structure is likely to be reinforced over time by natural processes of land accumulation (Henderson et al. 2014).

Albertus and Kaplan (2013) examine the case of land reform and long-term civil war in Colombia. They find empirical evidence to support “the paradox of partial reform” – land reform can be an effective counter-insurgency policy but may be politically difficult to implement at sufficient scale because it threatens the status quo. Incomplete land reform can generate positive effects outweighed by negative spillovers, leaving matters worse than with no reform. Alston et al. (2000) found a similar effect of incomplete land titling in Brazil.

Gomes (2015) examines district-level data from India to examine factors affecting the severity of the Naxalite-Maoist conflict in India, which started in 1967 as a dispute between tribal farmers and landlords and has since joined with a Maoist movement and spread to nearly 200 districts in 18 states. In a multivariate analysis, he finds that the severity of conflict is positively related to land inequality, the percentage of Scheduled Tribes in the district, low economic growth rates and the presence of landlords.

More widely, Albertus and Kaplan (2013) review the literature and find that scholars have linked land and land reform to rebellion in El Salvador, Nepal, Peru, Philippines, South Africa, Viet Nam and Zimbabwe. The literature suggests several causal relationships. Rebels may gain support by promising to redress inequalities if they take power, while an incumbent or prospective government can attempt to secure votes by promising land reform as an alternative to violent conflict. High land inequality that creates unemployment and low rural incomes reduce the opportunity costs for young people to join rebel groups and make them more likely to do so, while increasing the possible returns from revolutionary change. An abundance of primary commodities with high cash value, such as minerals or timber, can make it easier to finance rebel campaigns.

Sources: Alston et al. 2000; Albertus and Kaplan 2013; Henderson et al. 2014; Gomes 2015.

have been observed in many countries and are characterized as “forest transitions.” Rudel et al. (2005) note two types of forest restoration: economic development restoration, where increases in agricultural productivity – coupled with shifts of population from rural to urban areas – lead to abandonment and reforestation of cultivated land; and forest scarcity transition, where the scarcity of forest products pushes up their value and prompts tree planting on land previously cleared for agriculture. A variant of forest scarcity restoration is that policymakers and the general public increasingly recognize the value of the regulatory and support functions

of forests and allocate resources for forest conversion and tree planting. While most developing countries are still in the deforestation phase, countries such as China, Costa Rica, India, Nepal, Panama and Viet Nam, are in the restoration phase. Table 9.3 summarizes information on three examples of inequality and lack of inclusion in forest management and transitions.

TABLE 9.3 Three cases and implications of forest inequality

Cause of inequality/ non-inclusiveness	Examples	Implications for transformation	References
Eviction of indigenous people from areas designated as state forests for nature conservation or timber concessions	The Krui area of Sumatra, Indonesia where communities have long practised <i>damar</i> agroforestry on land designated as state forest.	Evictions may be justified on the basis of their contribution to rural transformation, but will tend to increase inequality, especially where no compensation is paid.	Kusters et al. 2007
Lands formerly used by smallholders without secure tenure allocated to large ranches or farms	Brazil in the 1980s-1990s when forest clearance was the primary source of expansion for soybean and ranching.	Allocation of sparsely populated forest areas to ranches or farms may be justified on the basis of transformation. However, these changes mean losses to poor people without title.	De Oliveira 2008
Women excluded from forest management institutions	Women in Uganda are largely excluded from forest governance despite their dependence on forests for subsistence, safety nets and income.	The safety net function of forests is undermined by transformation if the main beneficiaries are not involved in management.	Banana 2012

Water

Water availability is most severely constrained in North Africa and West Asia, where most countries receive less than 500 m³ of renewable water resources per person a year, compared with the 7,500-50,000 m³ per person a year in most OECD countries, the Americas and South-East Asia (WWAP 2015, p.12).¹³⁰

Water performs similar roles to land in economic transformation: its management and use contribute to expanding agricultural production in the early stages of transformation, limits to its availability check uncontrolled use but can lead to competition and degradation of water resources, the shift of water from agriculture to industry and to urban areas is necessary for them to expand (including through hydropower production) and later stages of transformation require highly efficient use of water in all sectors and areas. Three differences between water and land in transformation are significant, however: safe water is essential for human life, water has much stronger public good characteristics and markets have not been proven the best way to allocate water among competing uses.¹³¹

Development trends over the last 50 years have entailed increasingly unsustainable

increases in water use, even in countries with successful and inclusive transformations.

Groundwater irrigation saw near-linear growth during 1950-2005, with irrigation area doubling and water withdrawals tripling. Of the 3,800 km³ of fresh water withdrawn from rivers, lakes and groundwater sources each year, approximately 71 per cent is used for irrigation, 20 per cent for industry and 9 per cent for municipalities. While agricultural productivity grew faster than human populations over that time, that growth came at the cost of increased pollution, drying of rivers, damage to freshwater fisheries and degradation of land and water resources (CAWMA 2007). Regional patterns of groundwater irrigation are described in table 9.4.

By 2050, global water demand is projected to increase by another 55 per cent, mainly due to increased demand from manufacturing, energy production and domestic use (WWAP 2015, p. 2). Rosegrant (2014) predicts that worldwide by 2050, 52 per cent of the population, 49 per cent of grain production and 45 per cent of gross domestic product will be at risk due to water stress. Climate change will exacerbate that stress. For example, Arnell (2004) projected that climate change and population growth together

TABLE 9.4 Global survey of groundwater irrigation

Region	Groundwater irrigation		Groundwater volume used	
	Million ha	% of total	km ³	% of total
Global total	112.9	38	545	43
South Asia	48.3	57	262	57
East Asia	19.3	29	57	34
South-East Asia	1.0	5	3	6
Middle East and North Africa	12.9	43	87	44
Latin America	2.5	18	8	19
Sub-Saharan Africa	0.4	6	2	7

Source: Global Water Partnership 2012, derived from Siebert et al. 2010.

will increase the number of people experiencing water stress from 0.4-1.7 billion in the 2020s to 1.0-2.7 billion in the 2050s.

Increased use and competition for water has brought about conflict and increased inequalities within and between social groups, measured in terms of procedure and distribution. The Pacific Institute Water Conflict Chronology Map reported 37 water conflicts in 2012, 20 in 2013 and 16 in 2014. These “water wars” threaten international peace, all levels of government and business development (Balch 2014). Water conflicts often cross sectoral boundaries: for example, artisanal, small-scale and large-scale mining are major sources of water pollution in developing countries (table 9.5). Water conflicts also occur at the micro scale, with women often bearing the brunt of water provision within households and local residents bearing the cost of managing the catchment that provides water to downstream residents (e.g. Crow et al. 2012).

Water problems have gone underground, literally, across the world. It is estimated that 40 per cent of global irrigation uses groundwater (HLPE 2015). The World Bank (2010) estimates that over the last 50 years India has become dependent on groundwater for 60 per cent of its irrigated agriculture and 85 per cent of its drinking water. Millions of private wells have been constructed, partly due to deficiencies in

public water supply systems, improvements in pump technology and subsidies for the electricity used to power water pumps. Aquifer levels are falling across the country, with a 2004 nationwide assessment showing 29 per cent of groundwater blocks to be overexploited. Similar pressures have arisen in much of the rest of South Asia, northern China, Mexico and the Middle East (CAWMA 2007, p. 9). Overexploitation is one of the factors contributing to arsenic pollution of alluvial aquifers that now affects at least 30 per cent of public wells in the heavily populated Brahmaputra River basin of India and Bangladesh (Mahanta et al. 2015).

Responses

Individuals, communities, local authorities, national governments and international bodies have responded in different ways. Technical, organizational and political requirements for effective response vary greatly across the three resource types.

TABLE 9.5 Causes and implications of water inequality

Cause of inequality/non-inclusiveness	Examples	Implications for transformation	References
Allocation of water between countries in transnational watersheds	Blue Nile river shared between Ethiopia, Sudan and Egypt	Unresolved conflicts with Egypt over use of the waters of the Blue Nile delayed Ethiopia's irrigation and hydropower development for decades	Gebreluel 2014
Private wells replacing collective water tanks	Tamil Nadu, India	Wealthy farmers who invest in wells to extract groundwater remove important support for small reservoirs used by poor farmers. Wells are privately productive but bad for aquifers and surface water	Kajisa 2012
Mining extraction and processing, diverting and polluting water available downstream	Mines in highlands of Peru	Water quantity and quality have become a source of uncertainty and conflict between sectors	Budds and Hinojosa-Valencia 2012
Residents of informal urban settlements paying more for water than those with formal municipal connections	Global	Poor slum-dwellers pay up to 18 times more per litre than those with private connections. Water has become a major cost of slum living	Sima and Elimelech 2011
Women with the biggest role in household water provision, but lacking power and resources to make water investments	Western Kenya	Water collection is a heavy use of women's time that constrains intensification of agriculture	Crow et al. 2012

Land

Evidence of sustainable intensification of agricultural production has accumulated over the decades, beginning with Boserup (2005) and Ruthenberg (1971) and continuing with Pingali et al. (1987). Pretty et al. (2011) identified and reviewed 40 projects and programmes from 20 African countries where sustainable intensification was promoted or practised in the 2000s. Initiatives included introduction and promotion of new species and varieties of crops and livestock, agronomic and rangeland improvement, agroforestry, soil conservation, conservation agriculture, integrated pest management, horticulture, fodder crops and aquaculture. Results included more diversified farming systems, more productive soils, less use of chemical inputs and less soil and water pollution. Key elements of success across the 40 projects were effective collective action, information exchange, participatory technology development, novel partnerships between

donors and the private sector, a focus on women's particular needs and unique social capital, and enabling policies and public sector support. Heath and Binswanger (1996) found that land degradation in Colombia was mostly caused by distortive policies rather than the natural responses of farmers to population pressure.

About half the countries in the world are engaging in some form of land tenure reform (Alden Wily 2012), and around 1 billion farmers have already benefited from them (Lipton 2009). These reforms may be classified in six general types over the last five decades, with examples in parentheses:

- Redistribution of private rights from large to small and landless agriculturalists, usually without full compensation to the former owners (Ethiopia, India and Sri Lanka).
- Market-assisted reforms that redistribute land on the basis of sales between willing buyers and willing sellers (Argentina, Brazil,

Guatemala, Honduras, Indonesia, Liberia, Malawi, Namibia, Peru, the Philippines and South Africa).

- Distribution of land from collective farms to former farm workers or tenants (former USSR countries in Central and Eastern Europe, China, Cambodia, Lao People's Democratic Republic and Viet Nam).
- Large-scale registration of individual title in national registries (Ethiopia, Rwanda, Madagascar, Viet Nam, Mexico, Thailand, Namibia and Tanzania).
- Statutory recognition of customary land rights institutions (Botswana, Ghana, Mozambique and Tanzania).
- Flexible land tenure arrangements that have more stringent requirements for registering more formalized tenure arrangements (Mali, Namibia, Tanzania and Viet Nam).¹³²

Underlying all successful programmes have been major investments in the infrastructure of land registration, including cadastral surveys, computerized records, training in legal rights and resolution of land disputes (Byamugisha 2013). IFAD, the International Land Coalition and the World Bank have provided major support to those initiatives.¹³³ IFAD (2015) summarizes IFAD support to land policy dialogues in Lao People's Democratic Republic and in East and Southern Africa, and project financing in Haiti, Malawi, Nepal, Niger and Rwanda.

Many countries have recently implemented tenure reforms that recognize a continuum of property rights and tenure insecurity (Brueckner and Lall 2015). In Mali, for example, customary tenure is prevalent in rural and peri-urban areas, and is enforced by village chiefs and councils. An attribution letter recognizes the transfer of public land to an individual and provides a modest amount of tenure security. More formal and secure rights are provided by rural or urban residency permits, which provide temporary use rights, and by title, which provides full property rights. Implementation of this system has resulted in distinct tenure security zones, with the highest security near urban areas and weakest on the rural fringe (Selod and Tobin 2013). Similar gradations of land tenure are found in Viet Nam (Brueckner

and Lall 2015), Tanzania (Deininger 2015) and Namibia (Matthaei and Mandimika 2014).

In many countries, women have legal rights to own land according to statutory law, but customary law does not recognize these rights. Without proper mechanisms to enforce statutory laws – Burundi's Transitional Programme of Post-Conflict Reconstruction is an example of legal clinics supporting rural women in this area – women can be left without access to land or it can be taken away from them by male relatives.

A few land reforms have focused on the land rights of women and minority ethnic groups. Such reforms seek to redress some of the gender inequalities in land rights, with women previously holding only secondary rights to land they gain through others, primarily husbands, other male relatives or local chiefs. Women's rights thus tend to be weaker and vulnerable to loss when their husbands die or they are divorced (Archambault and Zoomers 2015, p. 4). Land registration programmes in Ethiopia, Rwanda and Peru explicitly sought to strengthen women's land rights through the issuance of joint titles. The IFAD-supported Women's Land Rights Project provides legal support to women and works with communities and village groups to secure women's access to land (IFAD 2011).

One of the main responses to the rapid rise of large-scale land investment has been the development and promotion of assessments, guidelines and codes of conduct by multilateral organizations and bilateral development agencies to guide governments of target countries and of investors.¹³⁴ The Voluntary Guidelines for Responsible Governance of Tenure for Land, Fisheries and Forests in the Context of National Food Security of the Food and Agriculture Organization of the United Nations (FAO) are perhaps best known. Table 9.6 summarizes some of the main areas covered by the Voluntary Guidelines and compares them with those of other major international initiatives to develop standards for resource use, including the 10 commitments of the International Land Coalition.

Forests

Designations of protected areas, devolution of forest management and greater use of agroforestry have been the main responses to the challenges of deforestation, forest degradation and increasing scarcity of forest goods and services. The amount of forest area designated for biodiversity conservation increased in all regions during 1990-2015, with the largest areas protected in South America (130 million ha), North and Central America (127 million ha), Africa (92 million ha), Asia (86 million ha), Europe (53 million ha) and Oceania (36 million ha). Thirteen per cent of the world's forest area is now designated for conservation (FAO 2015a).

Co-management, as well as joint, community and decentralized forest management, and payments for ecosystem services, have been implemented as alternatives for balancing the public benefits of protection with the private benefits of production. Progress with forest devolution has been most marked in Latin America, due in part to the strength of the region's indigenous peoples' rights movement, the rise of more accountable governments, international support and recognition of the important environmental functions of forests. In Asia, devolution of forest governance to community and user groups has progressed furthest in India, Indonesia, Nepal and the Philippines, while forest ownership has devolved to individual households in Viet Nam (Lawry et al. 2012). East Asia and Oceania has the highest proportion of forests under private ownership (42 per cent) (FAO 2015a).

In much of Asia and Africa, devolution is still very incomplete, with government forest agencies slow to release authority, as exemplified by Indonesia (Lawry et al. 2012). Payments for the ecosystem service functions of forests are being implemented at national or regional scale in China, Costa Rica, Ecuador, Mexico, South Africa and Viet Nam (Calvet-Mir et al. 2015). IFAD has supported research and pilot programmes on payments for ecosystem services, including the Green Water Credits project in Kenya and Morocco (<http://greenwatercredits.net/>), Rewarding Upland Poor of Asia for the

Environmental Services they Provide (<http://rupes.worldagroforestry.org/>) and Propoor Rewards for Environmental Services in Africa (<http://presa.worldagroforestry.org/>). All these projects focused on the potential for inclusive systems of payment for ecosystem services.

The advent of REDD+ under the United Nations Framework Convention on Climate Change has created new international interest in the ecosystem services of tropical forests, particularly the carbon storage, carbon sequestration and climate change adaptation characteristics of forests. The fifth assessment report of the Intergovernmental Panel on Climate Change in 2014 concludes that deforestation is one of the world's largest sources of greenhouse gas emissions, but that regrowth forest is also one of the world's largest carbon sinks (Smith et al. 2014, p. 827).¹³⁵

Some progress has been made with implementation of REDD+, with over 200 REDD+ demonstration projects initiated in over 40 countries and government-led REDD+ programmes developed in several countries and regions. Concerns that REDD+ will undermine indigenous peoples' rights has led to agreement on the need for host-country governments to monitor compliance with social and environmental safeguards (de Sassi et al. 2015).¹³⁶ The REDD+ social and environmental standards are compared with other natural resource standards in table 9.6.

Water

During the height of the Green Revolution in the 1960s-1980s, many Asian countries regarded national food security to be of high strategic importance and water management a responsibility of centralized public agencies investing in dams and canals to store water and move it to areas well suited for large-scale irrigated agriculture. Development agencies such as the World Bank invested in large water projects and agriculture became the primary user of water in many countries. Opposition to large dams mounted due to concerns over the environmental and human costs of dams and water diversion, leading to the formation of the World Commission on Dams and its report in November 2000 (World Commission on

Dams 2000). With a few notable exceptions, construction of large-scale dams slowed worldwide after the report's release – 46 of India's 50 largest dams were completed before 2000, for instance (Water Resources Information System of India 2015).

Times change: concerns about the impacts of carbon-based fuels on climate change are evoking new interest in dams for hydropower. Brazil, China, Ethiopia and Peru have constructed some of the world's largest new dams in recent years, including China's controversial Three Gorges Dam. They and others are planning to build more. There are new concerns about the impacts of reservoirs and loss of water for downstream communities.

Assessments undertaken at various scales, including globally, show the need to reallocate massive amounts of water from agriculture to industry, hydropower and urban consumers. The focus of water resource development has shifted from expanding large-scale infrastructure to water demand management, water use efficiency and improving water governance (Manghee and van den Berg 2012). IFAD's investment in agricultural water management focuses on smallholder irrigation, water for livestock, aquaculture and inland fisheries, soil and water conservation, wetland rehabilitation and watershed management (IFAD 2009).

Ecosystem management has been advocated as an important approach to more efficient and sustainable management of water resources. For instance, at broad scale, there is recognition that deforestation in the Amazon is reducing the "Amazon Sky Rivers" that cause the flow of moisture from the Amazon to southern Brazil.

Integrated water resource management (IWRM) has been promoted by many organizations, led by the Global Water Partnership. The key elements of IWRM are managing water at the basin or watershed level, optimizing supply from surface and groundwater supplies, managing demand through cost recovery and decentralized management, providing equitable access through user organizations and involvement of women and marginalized groups, establishing policies such as the 'polluter-pay' policy and water regulations, and intersectoral

approaches to decision-making that vest authority with those who have a stake in the process (GWP 2015).¹³⁷

Governments around the world have enacted new water strategies and policies inspired by the IWRM paradigm (Giordano and Shah 2014). A United Nations survey of 134 countries in 2012 showed that 82 per cent of countries had begun IWRM reforms, 65 per cent had developed IWRM plans and 34 per cent were at an advanced stage of implementing IWRM reforms (Kadi 2014). At the international level, some of the principles of IWRM have been incorporated into the United Nations Watercourses Convention, which came into effect in 2014 (see table 9.6).

All resources have been the subject of multistakeholder dialogues to develop new standards, codes of conduct and guidelines for responsible governance. Some of those standards have been codified into international treaties and national legislation (see table 9.6 for major initiatives). It is encouraging to see the strong common themes that emerge. Perhaps the weakest is the lack of special consideration for gender equality and women's rights. The FAO Voluntary Guidelines are most comprehensive in the issues they address, but are also not yet widely adopted in policy at national or international levels. The mining guidelines are from the International Council on Mining and Metals, not national governments or industry associations.

Impacts

The range and depth of responses to deeply rooted trends, patterns and challenges have yielded concomitantly wide and profound impacts, some anticipated, others not. Again, technical, organizational and political factors loom large.

Land

Innovations in sustainable land management have helped to sustain agricultural production for millions of farmers across the developing world. Pretty et al. (2011) estimate that more than 10 million African farmers have benefited from the 40 examples of sustainable intensification that they reviewed.

Kassam et al. (2014) estimate that while adoption of conservation agriculture is still nascent in Asia and Africa, where it is used on less than 1 per cent of all cultivated land, the approach has been adopted on 125 million hectares of land across the world, including 57 per cent of all cultivated land in South America.

Land reforms can reduce conflict in cases where there is lingering animosity over extreme inequality in landholdings and increase economic output from the rural sector. Explanations for this productivity effect include the inverse relationship between farm size and productivity, higher local purchasing of labour and services by small farmers or extraction of short-term economic rents by large land owners (Henderson et al. 2014).

Holden et al. (2013) describe “land to the tiller” reforms adopted in India and Sri Lanka in the 1950 and 1960s and in the Philippines in the 1970s. Under these reforms, land was taken from large landlords and given to their tenants, and farmers were allowed to keep self-cultivated farms. Some large landowners simply evicted tenants and hired workers, but there was a reduction in land tenancy from about 20 per cent before the reform to about 12 per cent in the mid-1960s. One disadvantage of these reforms was that no land was distributed to landless people. Looking across Africa and Asia, Holden and Otsuka (2014) conclude that there is strong evidence that land tenure reforms increase land investments and land rental in the short term, and empowered rural residents and sustained rural development in the longer term. Similarly, market-based land reform in Malawi (2004–2009) has had significant positive effects on landholdings, agricultural output and income of beneficiary households that were stable over at least three years after the reform (Mendola and Simtowe 2015).

A study of pilot projects that preceded full rollout of land tenure regularization in Rwanda found that land access improved for legally married women, resulted in better recording of inheritance rights for both men and women, and increased investment in soil conservation, particularly for female-headed households. The authors highlight three potential problems

with scaling up nationally, however: continuing tenure insecurity for unmarried women, legal restrictions on subdivision will limit formal registration of new transactions and subdivisions, and high fees and travel costs have already limited full enrolment of land into the national registry (Ali et al. 2014).

Historical examples in many countries show that institutions that ease registration of land held under customary tenure in new statutory systems has often deprived indigenous groups of their land and relegated them to infertile areas. Several examples after the coffee boom in Central America in the late nineteenth century illustrate this.

Several studies have recently been conducted of the impacts of Ethiopia’s land registration and certification programme that began in 1998, with 20 million parcels registered across the country by 2011. Deininger et al. (2011) used a four-period panel and data and difference-in-differences approach and found that land registration increased tenure security, land-related investment and rental market participation. Holden et al. (2009) and Melesse and Bulte (2015) found that land registration and certification resulted in greater land productivity. De Brauw and Mueller (2012) found that households with secure rights to transfer land were somewhat less likely to be involved in migration.

Forests

Countries and regions that experience declines in areas of natural forests often later register offsetting increases in planted forests, which may be owned by large firms or be an income source for smallholder farmers. Zomer et al. (2009) show that agroforestry is surprisingly common throughout the tropics: 7 per cent of the global agricultural land base has more than 50 per cent tree cover, while 46 per cent of the global agricultural land base has more than 10 per cent tree cover. Sandewall et al. (2015) examined the livelihood impacts of household plantations in Ethiopia, China and Viet Nam and found a variety of positive impacts. In their review of the literature on Africa, Kiptot and Franzel (2012) found that women’s participation

TABLE 9.6 Principles for inclusive governance of natural resources

Principle	Land, forestry, fisheries (FAO Voluntary Guidelines)	Land (ILC 10 commitments)	Forests (REDD+ social safeguards)
Recognition of resource rights as human rights	Article 4	Principle 1	Yes
Recognition of a diversity of rights (traditional, commons)	Article 8	Principle 3	Yes
Free, prior and informed consent for indigenous peoples	Article 9	Principle 5	Respect for knowledge and rights of indigenous peoples
Consultation and participation for affected communities	Article 7	Principles 6 and 7	Yes
Special focus on gender equality and women's rights	Article 5	Principle 4	No mention
Corporations to respect legitimate resource rights	Article 12	Principle 9	No mention
Consistent with national policy and intl. agreements	Articles 5 and 7		Yes
Consistent with ethical business practice	Article 12	Principle 9	No mention
Transparent resource governance	Articles 8 and 12	Principle 8	Yes
Fairness and equity in benefit sharing	Article 4		Yes
Comprehensive assessment of resource options	Article 20		No mention
Fairness and equity in resource allocation	Article 15	Principle 2	No mention
Transparent disclosure of taxes and payments	Article 19		No mention
Consistent with sustainable development	Article 11		Yes

Note: ILC = International Land Coalition.

Source: Voluntary guidelines – <http://www.fao.org/docrep/016/i2801e/i2801e.pdf>; Action Aid (2014; <http://www.actionaid.org>); REDD+ Cancun safeguards – REDD+ Social and Environmental Safeguards (2014; <http://www.redd-standards.org/key-issues/redd-safeguards>); ICMM Principles and Guidelines; International Decade for Action "Water for Life" 2005-2015 (http://www.un.org/waterforlifedecade/human_right_to_water.shtml). Dublin Principles: <http://www.wmo.int/pages/prog/hwrp/documents/english/icwedece.html#p1>; United Nations Watercourses: <http://www.unwatercoursesconvention.org/the-convention/part-ii-general-principles/article-5-equitable-and-reasonable-utilisation-and-participation/5-1-4-equitable-participation/>; <https://www.cbd.int/abs/text/default.shtml>; <http://www.landcoalition.org/>

Mining (International Council on Mining and Metals, principles and position statements)	Freshwater (United Nations Water for Life; Dublin Principles/ IWRM/ United Nations Watercourses Convention)	Genetic resources (Nagoya Protocol) (NP) of the Convention on Biological Diversity (CBD)
Yes	Dublin Principle 4 GA Resolution 64/292 in 2010	CBD does not address ownership of genetic resources
Yes	United Nations Watercourses – limited territorial sovereignty	CBD focuses on enhancing access to genetic resources
Respect for rights, interests and perspectives of indigenous peoples		NP Articles 6 and 7 require prior and informed consent or approval and involvement for use of genetic resources and traditional knowledge of indigenous and local communities
Consent, engagement and consultation	Dublin Principle 2 – United Nations Watercourses for states	
No mention	Dublin Principle 3	No mention
Yes	No mention	NP Article 20 on codes of conduct
Yes	No mention	NP Article 4 on international agreements
Yes	No mention	NP Article 20 on codes of conduct
No mention	Dublin Principle 2	NP Article 14 on benefit-sharing clearing house and information sharing
Yes	United Nations Watercourses – Principle 1	NP Article 5
No mention	Dublin Principle 1	No mention
No. But should contribute to national and local development	United Nations Watercourses – equitable and reasonable utilization	No mention
Yes	No mention	NP Article 14
Yes	Dublin Principle 4	No mention

is generally low in agroforestry enterprises that are considered men's domain, such as timber, but high in enterprises with less commercial value, such as soil fertility, fodder production and woodlots.

Many site-specific studies have been published on the impacts of devolution on forest transitions. A comparative analysis by Edmunds and Wollenberg (2013) concluded that forest cover increased in China, India and the Philippines after enactment of devolution policies, but that this occurred at the cost of decreased access to forest resources by local forest users. Afforestation involved exotic timber species that produce fewer products of value to local forest users and indigenous groups than indigenous species. Where forest devolution increased opportunities to market forest products, well-connected elites tended to dominate trade, excluding minority ethnic groups, women and other vulnerable groups. Forest devolution also led to greater state recognition of local users as legitimate land users, who deserve to be provided with state services.

A recent review of studies on the effects on equity of payments for environmental services suggests that no firm conclusion can be drawn. Many studies have reported positive effects, but these are mostly based on secondary and project management data, while several studies that have reported negative effects are mainly based on extensive fieldwork and primary data collection. The review suggests that programmes involving such payments are most likely to contribute to equitable effects when they fit with locally known management practices and local resource management institutions (Calvet-Mir et al. 2015).

Water

For all the challenges and evidence of unsustainable use of water, the past 20 years have seen many successes. Most regions of the world experienced modest gains in access to improved fresh water sources by urban populations over recent decades. Least-developed countries as a whole experienced an increase in the share of urban dwellers with improved water supplies from 79 per cent in

1990 to 84 per cent in 2012 (WWAP 2015). Investments in irrigation and water supply have generated attractive rates of economic return. Foster and Briceño-Garmendia (2010) estimated that World Bank loans to African countries generated average rates of return of 22.2 per cent for irrigation projects, 18.9 per cent for power generation projects and 23.3 per cent for water supply projects. The World Health Organization (WHO 2012) estimated that investments in water and sanitation services in developing regions generated returns of US\$5-28 per US\$1 invested.

Application of the IWRM approach has produced successes and criticisms. Lenton and Muller (2012) describe several successful applications, including in managing wetlands in Bangladesh, managing irrigation in Mali, allocating water in Chile and South Africa, and countries cooperating in the Mekong River basin. The case of South Africa is particularly instructive: severe water scarcity has been addressed through infrastructure and institutions like rising block tariffs that guarantee water as a right and a "working for water programme" that provides incentives for removing fast-growing invasive tree species (Easter and Liu 2007).

Giordano and Shah (2014) synthesize criticisms along three lines: IWRM became an end in itself rather than a means to solve specific challenges; the IWRM "brand" is sometimes used to camouflage other agendas; and IWRM is shutting out thinking about pragmatic and politically acceptable solutions to given problems. As an example of the kind of pragmatic solution needed, the authors describe the Jyotigram Scheme that helped to resolve the problems of overexploitation of groundwater in the Indian state of Gujarat, associated with lack of property rights to groundwater and free electricity provided to farmers to pump it. Rather than enforcing water pricing or full cost recovery for electricity as ways to rationalize power use, the scheme involved targeted subsidies and quantitative rationing of electricity supplies to domestic users, schools, hospitals, village industries and irrigation farmers. Results included a reduction in overuse of groundwater,

reduction of subsidy costs and more reliable electricity supplies.

Implications for investment and policy

Periods when land and other natural resources are degraded, stabilized or restored are frequent consequences of structural and rural transformations. Long-term degradation implies that institutional and technical changes are needed to encourage better conservation and investment, some cross-cutting and others specific to the three resources.

Cross-cutting

Evidence from all three of the resource cases suggests that transformation often leads to a bifurcated distribution in the size of enterprises, most clearly with farmland ownership in Paraguay, but also for small woodlots versus corporate-owned forests – and similarly with treadle pumps versus large-scale irrigation in Africa. When should governments and development agencies embrace this bifurcation, and when resist it? When do small- and large-scale subsectors complement, or compete? Transformation processes tend to exaggerate initial differences in natural resource access and control between groups. Without attention, these differences can lead to new forms of impoverishment, food insecurity and social conflict. Reforms of land, water and forest tenure can help to mitigate those differences. Civil society can play key roles in fostering collective forms of resource governance as well as social movements among members of vulnerable groups.

Multilevel institutional solutions are required. Several of the cases show that scope for institutional solutions at one institutional level (the level at which regulations define marginal conditions) depends on the institutional framework at higher levels.

IFAD and other international agencies have important roles in building the capacity of national agencies to manage land and natural resources in ways that are inclusive and sustainable over the long term. Reforms that redistribute and secure property rights to land and natural resources can be very

good investments if they are completed and maintained, and not sidetracked by strong vested interests.

Greater levels of public investment in research, extension and institutional capacity may be necessary. Sustainable intensification is a long-term goal that may well require project timelines exceeding the norm for agencies such as IFAD. Impact assessment for such agencies may have to focus more on programme than project impact, with stronger emphasis on institutional and political factors that drive, or constrain, effectiveness.

Initiatives such as the FAO Voluntary Guidelines for Responsible Governance of Tenure for Land, Fisheries and Forests in the Context of National Food Security help to set new standards and expectations for national governments and private investors with a stake in natural resources in developing countries. Multistakeholder platforms that bring together varying perspectives from government, industry and civil society can play key roles. The 10 commitments for people-centred land governance of the International Land Coalition provide another framework for judging the effectiveness of land governance institutions and land reforms.

Nevertheless, countries should avoid a race to the bottom in seeking to attract international investment. There is a risk that initiatives such as FAO's Voluntary Guidelines on large-scale land acquisition are so demanding that investors shift their attention to other countries that are less aggressive in implementing the guidelines. Regional approaches to implementing guidelines generally could counter that tendency.

Inclusive management of some resources is limited by lack of accurate and credible data, particularly for groundwater.¹³⁸ This lack can also hold back management and promote illegal exploitation of forests and irrigation water. An important role for international and national organizations is to collect and disseminate these data.

Land

Sustainable intensification requires governments and their donor partners to sustain higher levels of investment in research, extension and land tenure, support collective action and encourage private market development. Land-conserving practices, such as conservation agriculture and agroforestry, are still rare in most of Africa and Asia.

Reforms that strengthen security of property rights in an inclusive and equitable manner have strong potential. The dichotomy between insecure customary systems and secure statutory systems has been disproven and replaced with a more nuanced concept of a continuum of rights. Especially critical is attention to gender equality during enforcement of statutory laws. Depending on the context, there may be good opportunities to enhance security through recognition of customary authorities, recognition of group rights, rapid participatory registration of rights using geographic information systems, and gradations of more or less complete statutory rights.

Land tenure reforms that reduce inequalities of land rights can improve the performance and inclusiveness of transformation. There are many linkages between equality of land rights and transformation, some related to the production advantages of more equal distributions, and others related to the political economy impacts of more equal power relations. The latter tend to translate into more progressive social protection programmes, more equal investments in education, more mobile labour and less state protection for inefficient agricultural systems.

Land reforms that transfer responsibility for land management from customary to statutory institutions can improve efficiency and reduce conflict in some cases, but also have potential to increase elite capture, disempower indigenous groups and increase conflict. Governments should take care of the detail of tenure reforms, where possible prioritizing reforms that promote a greater a continuum of rights, sometimes recognizing group rights and customary authorities in more remote locations with flexible tenure arrangements and statutory registration of individual rights closer to cities.

In the short term, the greatest opportunity for efficient exchange of land rights may be through markets for fixed-term land rental rather than land sale. Smallholder farmers and indigenous groups should be protected from external pressures on land. It is important to distinguish changes in land use, scarcity and management driven from within the local agricultural sector from changes driven from outside it. Internal pressures will tend to be more gradual, and consistent with existing tenure systems. Recent increases in large-scale land acquisition in many regions, as well as the medium-scale farming sector in Africa, are driven by external pressures and thus more likely to be inconsistent with existing tenure systems.

Market-assisted or incomplete reforms have had mixed success on tenure insecurity or inequality. Experiences from Colombia, the Philippines and South Africa suggest that large farmers or customary authorities with entrenched interests in the status quo can hamper reforms with lingering negative effects on inequality and social cohesion. Market-assisted reforms have had more positive impacts where there has been adequate administrative capacity, political will and post-reform support services (Lahiff et al. 2013).

Land rental should be promoted, even if restrictions are put on sales, and can be important for optimizing use of land and labour in agriculture. It can also increase inclusiveness and welfare outcomes by providing land-rich but labour-poor households with a source of income and land-poor but labour-rich households with access to land.

Rural-urban trends may be as important as large foreign investments in increasing the scarcity of land (and water) resources in many countries. Urban residents may see investment in land as a way to maintain a secure source of livelihood, which may be particularly important in economies dependent on boom-bust commodity sectors. Depending on context, these investments may enhance rural market infrastructure, but possibly at the cost of inefficiency and inequity of land (and water) use.

Forests

Private plantations and planting of trees on private farms should be encouraged as part of intensification. Smallholder farmers can diversify and augment their incomes through household plantations and agroforestry.

Governments should seek pragmatic solutions that are politically acceptable to strong vested interests. Devolution of forest governance to legitimate local user groups should remain a policy priority. Devolution can help to protect user communities and indigenous groups that are vulnerable to external influences, such as large-scale land acquisition and conversion to plantation agriculture or ranching. Recognizing vulnerable populations as legitimate forest custodians can also help to secure citizenship rights for them. Forest agencies should regard local user groups who rely on non-timber forest products as guardians of the forest, not illegal harvesters.

There are contrasting cases of high land inequality in El Salvador and Guatemala and lower land inequality in Colombia and Costa Rica, the cases of rights for forest dwellers in Thailand and India, and the case of artisanal and small-scale mining in Mongolia. These illustrate that public decisions on property rights to land and natural resources translate into human rights, citizenship rights, public investments and ultimately into government policies that affect transformation. An example from India illustrates the role of a forest rights act in protecting indigenous peoples is presented in box 9.4).

Women can benefit from policy reforms that strengthen their rights to resources, especially those reducing their dependence on other primary right holders, such as their husbands. Direct benefits may be limited in the short term by other regulations or customs. Over the long term, however, the explicit attention to women's rights may translate into more general gains for women. Devolution of forest governance should pay close attention to including women and vulnerable groups, and in some cases, much is to be gained from training local forest managers so that they can better benefit from new markets for forest products, including REDD+.

Water

Markets can be very effective in allocating scarce resources, but often need to be augmented by public debates and decisions on priorities. This is most evident for water, where markets can lead to socially undesirable allocation between basic human needs, agriculture and industry. Good understanding of resource behaviour can feed into innovative solutions, such as graduated block pricing of water in South Africa.

Effective water resource management requires continual improvement and response to new circumstances. Post-apartheid South Africa is a case in which government has made continual change in water institutions as it has tried to improve efficiency and secure water as a right for all.

The IWRM principles have greatly benefited water management and the development of principles and standards for managing other natural resources. However, applying them can still be difficult and require periodic adjustment, especially as it is hard to develop the institutions needed. National governments need to make several decisions, quickly: how to ration water within agriculture and between agriculture and other sectors, how much to centralize or decentralize governance, how much latitude and oversight to provide to local authorities and how to regulate private water suppliers.

Water resource management needs to balance demand management and supply increase. Innovative pricing is one of several solutions for the former, but behavioural change of consumers – reducing waste, changing expectations and increasing efficiency – is often more effective.

Finally, improved information systems on groundwater water quantity and quality are needed. In many places, increased reliance on groundwater has delayed improvements to sound water management, which will be fettered for as long as so little is known about the status and trends of groundwater use, aquifer levels and water quality.

BOX 9.4 India's Forest Rights Act and indigenous peoples' rights

Many of India's minority ethnic groups (Scheduled Tribes) are heavily dependent on forests for livelihoods and income, particularly the women. Policy innovation to secure the rights of those 85 million people is important.

Governance of the country's forest resources has undergone fundamental changes over the last 35 years. In 1980, the country passed the Forest Conservation Act, which in effect abolished forest access rights of tribal people and criminalized their traditional subsistence activity. A Joint Forest Management programme began in 1990 with the objective of protecting and regenerating degraded forest with the participation of village communities, but it evicted hundreds of thousands of people from forest lands without compensation.

Led by a coalition of grass-roots organizations and forest dwellers from across the country, a major social movement formed to oppose these evictions – the Campaign for Survival and Dignity. It organized actions over four years, including nationwide protests of around 200,000 forest dwellers (Kumar and Kerr 2012). The Scheduled Tribes and Other Traditional Forest Dweller (Recognition of Rights) Act of 2006 (otherwise known as the Forest Rights Act 2006) recognizes historical injustices, and explicitly the rights of tribal communities “to hold and live in the forestland under the individual or common occupation for habitation or for self-cultivation for livelihood.” It takes an inclusive approach to individual forest rights, recognizing the claims of people who have no documentary proof of their landholding if they are cultivating it for their livelihood. The Act recognizes traditional forest rights for tribal groups for an array of uses, and committees that consider claims for individual rights have one third of their positions reserved for women. Implementation of the Act varies by region and by state.

A case study in the Banswara district of Rajasthan considered how the Forest Rights Act affected the position of women of the Bhil tribal group and concluded that women did not gain additional rights or representation, in part because they had strong traditional rights under Bhil traditions (Bose 2011). In other locations, forest dwellers have used the law to appeal against other laws and changes that threaten their rights, including a mine and a steel plant.

Source: Kumar and Kerr 2012.

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