

CHAPTER 09

Green Finance and Natural Capital Investments for Sustainable Economic Development

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Abstract

The current chapter focuses on the importance of green finance and natural capital investments for sustainable economic development with a global and Pakistan perspective. It calls for effective management of natural capital to yield long-term economic growth and for the financial system to be aligned with environmental sustainability. Based on international evidence, the chapter also reveals the development of green finance instruments such as green bonds, climate funds, and blended finance and their contribution to the financing of low-carbon and climate-resilient development pathways. It also examines the economic rationale for investing in ecosystems: forests, watersheds, soils, and other places, focusing on the role of these ecosystems in resilience, productivity, and well-being. The chapter reviews and explores the pertinent environmental issues in Pakistan such as water scarcity, land degradation, climate susceptibility and institutional disintegration, and examines the current green finance framework in Pakistan. It outlines key opportunities for Renewable energy, Sustainable agriculture, Watershed management and Ecosystem restoration and also highlights some issues regarding financial constraints, governance, and policy co-ordination. The chapter ends with a set of strategic pathways to mainstream green finance and natural capital in development planning, which demonstrates the need for inclusive, resilient and environmentally sustainable development.

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9.1 Introduction

Economic development has emerged as one of the primary policy concerns of the twenty-first century and sustainable economic development is the name of the game. Past growth-oriented development models have been more discrete, seeing a dichotomy between economic growth and environmental protection, but emerging thinking is acknowledging that long-term growth is a function of ecological stability, climate resilience, and responsible resource use. Growth that is seen to lead to forest destruction, water depletion, soil degradation, polluting cities and exacerbating climate risks may boost short-term production, but reduce the very fundamentals on which future production, social welfare and human well-being rely. In this context, the term 'green finance' and 'natural capital investment' has become a key element in the development strategy of today.

Green finance is the financial flows, policies, institutions and instruments that finance green activities. It comprises investments in renewable energy, energy efficiency, climate adaptation, sustainable transport, water management, circular economy systems, pollution control and biodiversity protection. It also covers financial regulation and risk management approaches that incorporate environmental and climate dimensions and considerations into lending, investment and public budgeting processes. Natural capital investment, on the other hand, involves investing in ecosystems and environmental assets like forests, watersheds, wetlands, mangroves, soils, biodiversity and water systems. These assets deliver ecosystem

services which are critical to economic life, such as flood protection, carbon sequestration, pollination, purification of water, fertile land, and climate regulation (Dasgupta, 2021; World Bank, 2021).

These ideas are becoming more prevalent because they represent a significant change in the economic mindset. Development no longer is considered solely as growth of gross domestic product. On the contrary, it has been increasingly seen as an improvement of human well-being that is achieved by the responsible management of multiple capital, namely produced capital, human capital, social capital and natural capital. The degradation of nature is real and comes at a true economic price due to declines in agricultural productivity, increases in disaster damage, loss of water security, health impacts and vulnerability of infrastructure. It is clear from the Intergovernmental Panel on Climate Change (IPCC, 2022) that climate change has already begun impacting livelihoods, assets and economic systems globally. Similarly, the Dasgupta Review highlighted the fact that the global economy is tied to nature, and not separate from it, and that the ongoing undervaluing of nature has been fostering unsustainable patterns of production and consumption (Dasgupta, 2021).

This is particularly important for developing countries. Facing the problem of environmental pollution, poor infrastructure, climate change vulnerability, lack of fiscal space, they are also suffering from the dual pressure of the need for faster growth, jobs and poverty alleviation. Large scale investment is often required in these countries for energy, transport, water and agriculture and industry, but if these investments are pursued in a carbon intensive and resource consuming approach, they can continue to bring future instability. Green finance can help to redirect investments towards more resilient and efficient growth models, and investments in natural capital can help to maintain the ecological systems upon which development is ultimately dependent. The World Bank (2023) and the Organisation for Economic Co-operation and Development (OECD, 2017) both emphasize that addressing climate-resilient and environmentally sustainable development is a moral and ecological issue but also an economic imperative.

The case of Pakistan is particularly relevant in the discussion of these issues. It is a growing country that has significant growth prospects and significant development needs, but it is also extremely vulnerable to climate change and environmental degradation, water scarcity, deforestation, land stress, urban pollution, etc. The devastating floods of 2022 exposed the capacity of climate shocks to simultaneously affect infrastructure, agriculture, livelihoods and macroeconomic stability (World Bank Group, 2022). Pakistan thus requires a development model without splitting the concepts of finance and ecology. It needs to leverage financial resources for climate adaptation, clean energy, resilient agriculture and sustainable urbanization and invest in watersheds, forests, soils and ecosystems, which have been the focus of a growing body of literature on green finance and natural capital for sustainable development, especially in the context of climate change and ecological degradation. The studies highlight that financial systems have a key role in influencing environmental outcomes, with their ability to promote the allocation of capital toward sustainable or unsustainable activities (OECD, 2017). Meanwhile, the importance of natural capital in national wealth has been growing increasingly evident, with ecosystems offering vital services that support economic production and human well-being (World Bank, 2021; Dasgupta, 2021). Climate-related risks are already having a negative impact on economic systems, as indicated by global assessments such as the Intergovernmental Panel on Climate Change (IPCC) 2022 report, further strengthening the need to financialize with environmental sustainability. Likewise, global efforts like the State of Finance for Nature highlight that investment in NbS is significantly underinvested, given that NbS is crucial for resilience building, biodiversity and long-term development (UNEP, WEF & ELD, 2021).

Even with these developments, there are key knowledge gaps in academic and policy literature. Current research is largely focussed on green finance or natural capital, often without a strong linkage between financial tools and ecosystems approaches in a combined development framework. Furthermore, the operationalization of these concepts in developing countries with multiple institutional capacity, fiscal space, and climate constraints are comparatively under-discussed. There is a relative lack of country-specific analyses, especially for highly climate-exposed countries like Pakistan. This chapter enriches the literature with an integrated approach by connecting the green finance instruments to an investment

strategy in the context of natural capital, along with contextualized analysis of opportunities, constraints and policy pathways in Pakistan.

This chapter examines the importance of green finance and natural capital investments from a global and Pakistani context to sustainable economic development. It starts with an exploration of the conceptual background of green finance and natural capital. It then explores the international development of green finance, its tools and the economic rationale behind investing in ecosystems. It then examines the environmental and developmental context of Pakistan, the potential of Green Finance in the country, key investment opportunities in Natural Capital and the challenges to overcome for progress. The chapter ends with strategic directions for connecting finance, nature and development in a unified and comprehensive way.

9.2 Conceptual Foundations of Green Finance and Natural Capital

The policy focus on green finance has emerged since the environmental and financial domains have been traditionally separated but are now looking for a bridge with green finance. Until recently, environmental policy had been primarily a matter of regulation, pollution control, protected areas, or conservation programs, and finance was mainly about capital mobilization, credit allocation, risk management, and return on investment. Green finance can seamlessly bridge these worlds as it acknowledges the fact that the financial system not only affects the sectors that expand, but also the technologies used and the dominant forms of production. When capital is increasingly diverted to activities that pollute and use more resources, environmental degradation will worsen. Economic transformation is possible if finance can be channeled towards clean energy, sustainable infrastructure, resource efficiency and ecosystem restoration (OECD, 2017).

Green finance has both public and private aspects. On the public side, this includes green budgeting, environmental fiscal reform, climate funds, development bank loans, guarantees and concessional loans, and public investment in sustainable infrastructure. On the private side, it covers green bonds, sustainable banking, green venture capital, environmental risk screening, impact investment, environmental, social and governance (ESG)-informed asset management, and ESG. It also introduces prudential and disclosure agendas to incentivise financial institutions to identify and account for climate and environmental risk in their portfolios. Green finance is not a specific product, in this sense. Instead, it's a larger effort to link financial systems to sustainability results.

Natural capital, on the other hand, is the value of the assets of nature that provide a stream of beneficial ecosystem services over time. They range from forests to soil, rivers to biodiversity, wetlands to oceans and the atmosphere. Many of the services they provide are not priced in markets, and this is often overlooked and underappreciated of their economic importance. Flood damage can be mitigated by wetlands. Forest cover helps to preserve watersheds and hold carbon. Mangroves provide land protection from storms and fisheries. Agricultural yields are sustained in healthy soils. Food systems are dependent on pollinators. Such services may be considered economically useful even if they are not sold and purchased in the regular market. Loss of natural capital means loss of economy in terms of lower resilience, increased production cost and increased shocks' vulnerability (Dasgupta, 2021; Barbier, 2011).

The linkage between green finance and natural capital is thus direct. Financial mechanisms for natural capital investments are likely to need mechanisms that can capture long-term social returns, even if there are no clear immediate private returns. Policy interventions, blended finance and concessional funding are essential for ecosystem restoration, watershed conservation, land rehabilitation and biodiversity protection to mobilize adequate private sector investment, as the benefits of these activities are broadly felt in the community. Green finance serves as the instrument to structure, support and scale these investments.

This logic is reinforced with a sustainable development perspective. According to the World Bank's wealth accounting framework, the success of a country over time relies on managing a country's total wealth, which is divided into three parts human capital, produced capital, and natural capital (World Bank,

2021). A nation that grows GDP at the expense of aquifer depletion, deforestation or pollution could seem to be expanding its wealth, but in fact it is trading off its assets. Sustainable development must not only produce an income but also protect and enhance the productive bases for future income. Green finance and natural capital investment can bring about a paradigm shift in policy from short-term output growth to long-term value preservation.

9.2.1 Global Evolution of Green Finance

There are several converging trends driving the global development of green finance. The greatest of these has been the realization that the economic and financial implications of climate change are significant. Physical risks like floods, storms, droughts, sea-level rise and heat waves harm assets, lower agricultural production, disrupt supply chains, and lead to higher insurance losses. Transition risks emerge when economies move towards lower carbon versions, potentially depressing the worth of carbon-intensive assets, and impacting market expectations. Financial institutions, regulators and investors have therefore started to view environmental sustainability as an ethical topic, as well as an asset quality, stable portfolio, and long-term return topic (IPCC, 2022).

The expansion of international policy commitments has also been an important factor. Governments and development institutions have been pushed by the Paris Agreement, Sustainable Development Goals and other land and biodiversity restoration and protection frameworks to incorporate sustainability in investment planning. Increasingly, multilateral development banks, sovereign funds and donor agencies view climate and nature financing as a key pillar of development cooperation. The Economics of Land Degradation, the United Nations Environment Programme, and the World Economic Forum highlighted the need for a significant boost in the volume of investments in NbS to help countries achieve climate, land degradation, and biodiversity goals (UNEP, WEF, & ELD, 2021).

The market has responded with the development of green bonds and other products. Green bonds are debt instruments whose proceeds go towards funding environmentally friendly projects. They have grown due to their capacity to create a familiar tool to incentivize private investment toward sustainable industries. Sustainability-linked bonds and loans take it one step further by tying financial terms to the borrower's achievements on environmental or sustainability goals. These tools are a message that there does not have to be a trade-off between financial and environmental results. They also have concerns around credibility, transparency and greenwashing, their importance is growing, and taxonomies, disclosure standards and verification mechanisms are becoming more critical.

Particularly noteworthy in the development of green finance in developing countries are development finance institutions. There are many investments that are green or nature-related, that have high initial costs, long payback periods, limited collateral and uncertainty around policies. These obstacles can be overcome, and private capital can be drawn in through mechanisms such as concessions, first loss capital, guarantees and technical assistance. This is especially true for climate adaptation and natural capital projects, which can have significant social returns and low upfront cash flows. Development of renewable energy and green transport projects can be appealing to commercial actors under enabling regulatory frameworks, whereas projects on watershed restoration, floodplain management, biodiversity conservation, or drought resilience typically require more robust public engagement.

The global green finance agenda has also grown to encompass climate adaptation, resilience and biodiversity. This is a significant change as environmental sustainability is not just about reducing carbon. Water security, ecosystem services, coastal protection, land restoration, and agriculture resilience are also very critical, especially in developing countries. Central banks and financial regulators have increasingly paid attention to climate-related financial disclosures, stress testing and supervisory expectations regarding environmental risk over the last few years. The developments indicate that the role of green finance is shifting from the periphery of development policy to the center of financial governance.

Table 9.1. Key instruments of green finance and their development relevance

Component	Main Purpose	Development Relevance
Green bonds	Raise capital for environmentally beneficial projects	Supports renewable energy, clean transport, water, and green infrastructure
Sustainability-linked loans	Link financing terms to sustainability performance	Encourage firms to improve environmental practices
Blended finance	Combine public or concessional and private capital	Reduces risk in developing-country green projects
Climate funds	Support mitigation and adaptation investments	Helps finance projects with high social value but low immediate commercial return
Sustainable banking guidelines	Integrate environmental and social risk into lending	Improves risk management and redirects credit flows
Green taxonomies and disclosures	Define eligible green activities and improve transparency	Reduces greenwashing and improves investor confidence
Nature-based finance	Fund conservation, restoration, and ecosystem services	Enhance resilience, biodiversity, and local livelihoods

Source. Adapted from OECD (2017), UNEP et al. (2021), World Bank (2018), and State Bank of Pakistan (2021).

9.2.2 Natural Capital Investments and Their Economic Logic

The investment of natural capital is gaining recognition as one of the most critical but underinvested pillars of sustainable development. Environmental policy had been centered on regulation of certain types of pollution or protection of specific areas for many years, without much consideration given to the economic role of ecosystems. More recent studies have focused on ecosystems as capital that facilitates production, resilience and human welfare. Forest regulation of water flows, wetlands absorption of flood effects, mangroves shoreline protection, fertile soils of agriculture are important economic values (Barbier, 2011).

There are three key arguments for investing in natural capital. The first is services which are essential for ecosystems that cannot be replicated at a high cost by technology, or lead to significant losses without them. For instance, watershed degradation can lead to sedimentation, lower water quality and higher costs to maintain infrastructure. Loss of coastal ecosystems can increase vulnerability of settlements and ports to storm damage. Loss of pollinators may lead to a loss of crop yields. Ecosystem restoration or conservation is often more cost-effective than the provision of ecosystem services in an entirely engineered way.

Secondly, investments in natural capital help to enhance the resilience to climate change. Ecosystems can mitigate floods, droughts, storms and heat stress with greater frequency and intensity due to climate change. During heavy rains, wetlands retain excess water. Forests help to hold soil and control runoff. Mangroves act as buffer to wave energy. In drought periods healthy soils will hold water. These functions are not only for the protection of the environment, but also for economic stability. Unmet natural systems demand can result in increased disaster losses and adaptation costs later in the day for a country.

Thirdly, investments in natural capital can enable inclusive development. Poor and rural people tend to be more direct users of natural resources to provide water, food, fuel, grazing and livelihood. Environmental degradation is, therefore, likely to affect them first and most severely. Sustainable land management, watershed restoration, community forestry and agriculture based on ecosystems can increase resiliency, incomes and decrease vulnerabilities. This means that natural capital is important not just for macroeconomic sustainability but social justice and poverty reduction too.

However, despite its advantages, natural capital is under-invested and under-valued because many of the ecosystem services are public goods and return the benefits broadly, but the return to private investors can be difficult. Another is that the typical financial appraisal techniques for development planning tend to undervalue the long-term ecological value. Thus, public policy, blended finance, environmental

accounting, and better valuation mechanisms are vital to the scaling up of nature-related investment. Payments for ecosystem services (PES) can provide an additional mechanism for aligning financial incentives with sustainable natural-resource management, although institutional mechanisms for implementing such approaches remain limited in Pakistan (Tanveer et al., 2026). Dasgupta (2021) has pointed out the need to start recognizing the depreciation of produced assets in the same way the depreciation of natural assets is recognized.

9.2.3 Green Finance, Natural Capital, and Sustainable Economic Development

Green finance and natural capital investments contribute to sustainable economic development in several interconnected ways. At the most direct level, they enable investment in sectors that improve efficiency, reduce risk, and support long-term productivity. Renewable energy reduces dependence on imported fossil fuels and exposure to price volatility. Energy efficiency lowers production costs and can increase industrial competitiveness. Climate-resilient infrastructure reduces losses from extreme weather. Sustainable transport can reduce pollution and congestion while improving urban productivity. Waste management and circular economy systems can recover value from materials while reducing environmental harm. “The relationship between green finance, natural capital, and sustainable development outcomes can be conceptually illustrated as shown in Figure 1.”



Source: Author's illustration based on Dasgupta (2021), World Bank (2021), and OECD (2017)

Figure 9.1. Conceptual framework linking green finance, natural capital, and sustainable economic development

Structural transformation is fostered at a higher level through green finance. There are still many nations that need to put a lot of money into the infrastructure, housing, and transportation as well as industrial modernization. It's a question of how, rather than if, they invest. Such investments, if taken through high-carbon and resource-intensive processes can produce technology lock-in and future adjustment costs. When managed according to the principles of green finance, they can contribute to the creation of more resilient, more adaptive and cleaner economies. The OECD (2017) contended that investment-based

climate action can boost productivity and growth, if investment is combined with innovation, modern infrastructure, and regulatory reform.

The protection of ecological systems that support the economy by natural capital investment further facilitates this transformation. Water, soil and climate stability are essential for agriculture. Watershed integrity is a requirement for hydropower. Drainage systems, green spaces, and clean water sources are essential to cities. Fisheries, wetlands and shoreline ecosystems are critical for coastal economies. Not taking account of these interdependencies can lead to a misleading impression of development growth, wherein GDP growth is short-lived while resilience and income-generating potential is diminished. The World Bank (2021) thus emphasizes the need to take a comprehensive view of the management of national wealth rather than output alone.

But there’s also a financial stability factor. The increasing degradation of nature and climate risks impact loan performance, insurance premiums, fiscal balances, and asset values. Reducing systemic risk means allocating investment resources away from risky and unsustainable activities and towards activities that are more resilient and sustainable. For this reason, green finance is seen as a development tool and a part of good financial governance.

9.3 Global Challenges in Scaling Green Finance and Natural Capital Investment

However, green finance has yet some serious drawbacks. One of the largest of them is the amount of the funding deficit. Climate change mitigation, adaption, biodiversity protection and land restoration needs are much higher than flows. NbS continues to be underfunded, relative to sectors that harm ecosystems. Climate finance is also not equitably available, as developing countries typically receive much less than what is required for them to meet their climate adaptation and mitigation costs, despite their high vulnerability to climate change (UNEP et al., 2021).

Private returns and social returns do not always match up is another challenge. Most green and natural capital initiatives bring significant benefits to society over the long term, but often low or unpredictable revenues to the investor. Public benefits of adaptation projects, watershed restoration, biodiversity conservation and urban ecosystem protection are difficult to quantify. Such projects might still be less attractive to private investments if their investment is not supported by concessions, guarantees or public co-financing.

Table 9.2. Global challenges to scaling green finance and corresponding responses

Challenge	Economic Consequence	Green Finance or Natural Capital Response
Climate change	Asset damage, crop losses, infrastructure risk, fiscal strain	Climate funds, resilient infrastructure finance, adaptation bonds
Biodiversity loss	Reduced ecosystem resilience, lower productivity, tourism loss	Nature-based finance, biodiversity funds, restoration finance
Land degradation	Lower agricultural yields, rural poverty, water runoff	Sustainable land management finance, blended finance for restoration
Water stress	Industrial disruption, food insecurity, urban shortages	Water-efficient infrastructure, watershed investment, green municipal finance
Fossil fuel dependence	Import vulnerability, pollution, price shocks	Renewable energy finance, green bonds, clean technology investment
Urban pollution and heat	Health costs, lower labor productivity, reduced livability	Green urban infrastructure, clean transport finance, energy-efficient buildings

Source. Adapted from IPCC (2022), OECD (2017), UNEP et al. (2021), and World Bank (2021).

Weak institutional and regulatory capacities in many countries are a third challenge. Technical preparation, regulatory clarity, credible environmental standards, reliable data, and co-ordination among agencies are necessary for bankable green projects. Project pipelines can be narrow, capital markets are less developed, and policy environments are less uniform in low and middle-income countries. Investors continue to be discouraged by currency risk, debt stress and governance issues. The limits imposed on

green finance therefore prevent it from being scaled up on the market but necessitate wider institutional development.

Lastly, there is the credibility issue. However, with the rise of popularity of green finance, there is also an increasing worry about greenwashing. Unabusive use of sustainability labels may make investors lose faith and have little impact. Hence strong disclosure rules, taxonomies, reporting standards and verification process are critical.

9.4 Pakistan's Environmental and Development Context

Pakistan's development challenge illustrates why green finance and natural capital investments are urgently needed in practice. The country has significant economic potential, a large population, an important agricultural base, and growing urban markets. At the same time, it faces serious environmental constraints and climate-related threats. Water scarcity, land degradation, air pollution, deforestation, glacial melt variability, flood exposure, and heat stress all affect long-term productivity and welfare. These issues are not peripheral to the economy; they shape agricultural performance, public health, infrastructure resilience, and fiscal stability.

Climate vulnerability is particularly significant. Pakistan has repeatedly experienced severe floods, droughts, heat waves, and extreme weather variability. The 2022 floods caused enormous damage to housing, crops, roads, irrigation systems, and livelihoods, demonstrating how climate shocks can quickly become development and macroeconomic crises (World Bank Group, 2022). Because agriculture remains central to employment and food systems, climate risk has broad economic consequences. Heat stress affects labor productivity and crop performance, while water variability threatens both agriculture and urban supply systems.

Environmental degradation compounds these risks. Water management challenges have intensified due to inefficient irrigation, groundwater pressure, and insufficient watershed protection. Soil quality is affected in many areas by salinity, erosion, and nutrient imbalance. Urban air pollution imposes major health costs and reduces labor productivity. Forest cover is limited and unevenly distributed, while ecosystems such as wetlands and coastal zones remain under pressure. These conditions reflect a long-standing tendency to treat natural capital as secondary in development planning rather than as a core economic asset.

Pakistan's energy and infrastructure profile also makes green finance important. The country has faced persistent issues related to energy security, import dependence, circular debt, and transmission inefficiencies. Investment in renewable energy, energy efficiency, and resilient infrastructure could reduce these pressures while contributing to environmental goals. Similarly, sustainable transport and better urban planning could help address congestion, pollution, and rising climate stress in cities. The Government of Pakistan's updated climate commitments indicate recognition of these needs, but implementation depends heavily on financing capacity and policy coherence (Government of Pakistan, Ministry of Climate Change, 2021).

9.5 Green Finance in Pakistan: Emerging Architecture and Constraints

The Pakistan's green finance system is in its nascent stage, but some progress is seen. The State Bank of Pakistan has recently issued Environmental and Social Risk Management guidelines for financial institutions, marking an important change in understanding how lending practices relate to environmental and social risk management (State Bank of Pakistan, 2018). These guidelines call on banks to consider environmental and social risks of financed activities, and this is a crucial step towards wider sustainable finance development. This is important, as banking continues to play a crucial role in financial intermediation in Pakistan.

The green finance ecosystem is, however, still not developed enough. The domestic capital markets are fairly shallow, and the mobilization of long-term project finance can often be challenging. The pipelines of bankable projects are not well-established in many green sectors, especially in the adaptation and ecosystem restoration sectors. Project preparation, feasibility studies, environmental valuation and

blended finance structuring capacities may be lacking within public institutions. High regulatory uncertainty, limited exit opportunities or poor returns may be experienced by private investors in projects, particularly in projects which are likely to yield widespread and long-term benefits.

Meanwhile Pakistan has far-reaching external opportunities. Multilateral development banks, climate funds and bilateral partners can help finance green infrastructure, renewable energy, adaptation and NbS. Concessional finance is particularly applicable to Pakistan’s climate vulnerability. However, the external financing needs are not sufficient. It must be matched by robust national institutions, better policy coherence, more effective governance and better coordination between finance, environment, water, energy and planning ministries and departments.

Fragmentation of environmental and financial planning is one of the key issues in Pakistan. Climate policy, water governance, forestry, agriculture, urban planning and fiscal decision-making are often separated out into different institutional avenues. This fragmentation increases the difficulties of formulating solid green investment policies. It also reduces the incorporation of nature into the mainstream of public investment planning. In the absence of these links, green finance could stay at a particular project level instead of being a wider development framework.

9.6 Natural Capital Investment Opportunities in Pakistan

Natural capital investment has significant development opportunity in Pakistan who has several large-scale opportunities for natural capital investment to have a significant development return. Watershed and catchment management is one of the key ones among them. Upstream ecological conditions, variability of rainfall, glacier systems, and river basin management are all important to the country’s water security. Watershed degradation can exacerbate flooding, degrade water quality, increase sedimentation and impair hydrological stability. Afforestation, slope stabilization, catchment restoration and land management investments can thus benefit agriculture, hydropower, drinking water and disaster resilience all in one.

Table 9.3. Natural capital investment opportunities in Pakistan by sector

Sector or Area	Key Problem	Investment Opportunity	Likely Development Benefit
Renewable energy	Import dependence, energy insecurity, emissions	Solar, wind, grid upgrades, clean financing	Lower energy cost, reduced import burden, cleaner growth
Water and watersheds	Flood risk, sedimentation, scarcity, weak recharge	Watershed restoration, efficient irrigation, catchment management	Better water security, reduced disaster losses
Agriculture and soils	Climate vulnerability, land degradation, low resilience	Soil restoration, agroforestry, climate-smart farming	Higher rural resilience and productivity
Forestry and landscapes	Deforestation, erosion, biodiversity loss	Reforestation, landscape restoration, community forestry	Carbon benefits, watershed protection, local livelihoods
Urban systems	Heat stress, pollution, poor drainage	Green urban infrastructure, clean transport, urban greening	Improved health, resilience, and livability
Coastal ecosystems	Mangrove loss, storm exposure, habitat decline	Mangrove restoration, coastal ecosystem finance	Adaptation, fisheries support, coastal protection

Source. Adapted from Government of Pakistan, Finance Division (2023), Government of Pakistan, Ministry of Climate Change (2021), FAO (2021), World Bank Group (2022), and State Bank of Pakistan (2018).

Climate smart agriculture and soil rehabilitation are also important aspects. The agriculture sector in Pakistan continues to be very vulnerable to water scarcity, heat stress, and land degradation. Investments in soil health, agro-forestry, improved moisture retention, sustainable land use, and ecosystem-based adaptation will have the potential to increase productivity and decrease vulnerability. This is particularly crucial because ecological stability plays a vital role in the livelihood of rural communities and food

security. FAO (2021) highlighted that the sustainability of land and water resources is crucial for sustainable agricultural production in the future.

A third opportunity is in forest and landscape restoration. Forest has several advantages such as carbon sequestration, watershed protection, biodiversity conservation, local livelihood support etc. Though Pakistan has embarked upon various afforestation projects in recent years, only ecological design, institutional maintenance and community involvement can have long-term impacts. Ecological or landscape restoration is not just about 'plants'; it must also include more comprehensive ecosystem restoration and be integrated with the local socio-economic situation.

There is an increasing focus on urban nature capital. The heat stress, drainage issues, pollution, and unplanned urban growth are all growing threats in Pakistani cities. Improving urban green spaces, restored wetlands, tree cover, and nature-based drainage will all help to limit heat, control stormwater and enhance public health. Urbanization is a fast process and including natural capital in city planning is strategic not luxury.

Finally, is the relevance of coastal ecosystems (Mangroves and wetlands) for parts of Pakistan. They offer protection to the shoreline, fish nursery support, biodiversity value and benefits for climate adaptation. The degradation of these systems raises the economic and environmental risk. Coastal restoration investments can thus benefit both the livelihoods of communities and the country's resilience.

9.7 Barriers to Progress in Pakistan

While there are good prospects, certain challenges still exist in the field of green finance and natural capital investments in Pakistan. The first is institutional fragmentation. Structures for environmental, financial, agricultural, urban and climate policies are not well coordinated and rarely designed and implemented together. This makes it hard to put together project pipelines or to develop coherent financing schemes.

The 2nd is financial depth and project preparation limitations. Technical studies, long-term planning, risk assessment and blended finance structures are often requirements for green and nature-based investments. Not all public institutions are yet capable of assembling these types of projects on a large scale. Private sector investors, on the other hand, might be deterred by policy uncertainty, long time horizons, or lack of monetization options.

The third barrier is the lack of historical consideration of natural capital values. The economic value of ecosystems and the cost of their degradation is not always included in public investment appraisal, national accounts and sector planning. This can make it seem more economical to do an activity that is bad for the environment in the short term than it is to do an activity that is good for the environment. The absence of improved accounting and valuation leads to policy decisions that are biased towards depletion.

Macroeconomic stress is a fourth barrier. The fiscal constraints, financial pressures and financing challenges faced by Pakistan restrict its capacity to invest in the environment in the long-term. Stabilization is frequently a time for the short-term fiscal and balance-of-payments matter rather than the more long-term ecological resilience. However, if the investment is delayed, then the cost in the future may rise.

Political economy is a fifth barrier. Reforms in energy pricing, land use, water management and subsidy systems can create opposition from vested interests, or short-term costs on vulnerable groups. Including, legitimating, and protecting the transition will therefore be as much about its design as it will be about social protection and legitimacy.

9.8 Strategic Pathways for Sustainable Economic Development

Transforming green finance and natural capital investment to contribute to sustainable economic development effectively both globally and in Pakistan requires a few strategic changes. First, sustainability should be part of the mainstream economic agenda and not an environmental concern. The

finance ministries, planning bodies, central banks and development agencies must make natural capital and climate resilience issues at the macro-economic level.

Second, financial systems should do much to better respond to environmental risk. This comprises disclosure, prudential guidance, and environmental risk screening and improved project classification. Green taxonomies and sustainability reporting can help to remove ambiguity and give investors greater confidence. By establishing more specific and focused green financing practice, financial regulators and banks in Pakistan can leverage the existing environmental and social risk management framework.

Thirdly, the government should choose to use public funds efficiently to leverage private investment. This is especially true for adaptation and ecosystem restoration, where there might be fewer commercial returns but high social returns. To overcome this challenge, blended finance, guarantees, concessional loans, and public-private structures can be used.

Fourth, there needs to be a strengthening of natural capital accounting and valuation. Forest, water, soil and ecosystems are recognized as productive assets and the investment priorities are more well-balanced when assessed as such in policy appraisal. It can help with budgeting, infrastructure planning and long-term development plans.

Fifth, the green transitions should be socially inclusive. Without a shift in costs to the larger farmers, low-income groups, etc., the path to sustainable development cannot be paved. Green finance should enable access to affordable clean energy, climate resilient agriculture, sustainable livelihoods, and ecosystem stewardship. Inclusion is not only a moral issue, but also one which enhances the sustainability and acceptance of reforms.

9.9 Conclusion

In a world where sustainable economic growth is the ultimate goal, green finance and investments in natural capital have become more of a mainstay of this agenda, given a simple economic fact: sustainable success relies on ecological stability, and financial systems influence economic behavior and how societies utilize and safeguard environmental assets. The global transition towards green finance is driven by the realization that the effects of climate change, biodiversity loss, pollution and ecosystem degradation are not just incidental consequences of the economy but central pillars of economic resilience, economic productivity and welfare. The investment in natural capital reinforces this change: forests, soils, wetlands, watersheds and natural systems are productive assets which need to be preserved for the success of development to last.

On the international level, there has been a lot of momentum with the development of green bonds, sustainability-linked finance, climate funds, and blended finance. However, significant financing gaps still exist, especially for NbS and adaptation in developing countries. Greater institutions, environmental accounting, credible regulatory frameworks and more ambitious public-private collaboration is needed to scale up these flows. The demand is particularly strong from Pakistan. Environmental vulnerability to floods, heatwaves, water stress, land degradation and urban pollution demonstrates that environmental sustainability is inseparable from economic planning for the country. There is a significant investment need in Pakistan for renewable energy, resilient infrastructure, sustainable agriculture, watershed restoration, urban greening and protection of ecosystems. Green finance provides tools for mobilizing this investment and natural capital approaches can help development not to take place at the expense of its ecological foundation.

In conclusion, sustainable economic development is not to be equated with compromises between growth and the environment. Instead, it must be understood to create productive, resilient and inclusive economies that will protect natural systems upon which all human activity is dependent. Green finance and natural capital investments are not a mere side-effect of innovation. They are now key elements in economic policy in an ecologically interdependent and climate-constrained world.

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