

Implementation of SAPCC: A Green Growth Approach

A Guide for Karnataka's Policy Practitioners



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1

Green Growth and its relevance for Karnataka

In 1992, the UN Conference on Environment and Development (UNCED) made Sustainable Development an overarching goal for the international community. Since then, governments around the world have initiated the formulation and implementation of such strategies with varying degree of success. However, there are continuing concerns over economic and environmental developments in many countries - some of these have intensified due to prolonged global energy, food and financial crises. These developments have been underscored by continued warnings from global scientists that society is in danger of transgressing a number of planetary boundaries or ecological limits.

In this context, 'green economy' was proposed as a means for catalysing renewed national policy development and international cooperation and support for sustainable development. Green growth was adopted at the Fifth Ministerial Conference on Environment and Development (MCED) in Asia and the Pacific in 2005 as a strategy for achieving Millennium Development Goals 1 (Poverty Reduction) and 7 (Environmental Sustainability).

However, there is still a lack of clarity around what 'green economy policy' encompasses and how it integrates with national and sub-national priorities and objectives relating to economic growth and poverty eradication. This stems from a lack of experience in designing, implementing and reviewing the costs and benefits of green economy policies and measures.

What is Green Growth?

There are varied definitions of 'green growth' as coined by the different agencies. However, there is commonality in these definitions, including:

Achieving economic growth while ensuring environmental sustainability, inclusive job-creation, inequality and hazard reduction, and resilience of livelihoods for most vulnerable populations

OECD, 2011; UNEP, Yearbook: Emerging Issues In Our Global Environment, 2011; UNESCAP, 2012; World Bank, 2012

The concept of green growth has been evolving over the past few years and there have been efforts to incorporate green growth concepts into planning mechanisms such as Low Emissions Development Strategies (LEDS), sustainable development, climate change resilience and response, and clean energy and sustainable land use.

GENESIS OF GREEN GROWTH IN INDIA

The concept of "green growth" has its genesis in the vision underlying the Thirteenth Finance Commission's (TFC) recommendation (TFC, 2013), where the concept was articulated as, "rethinking growth strategies with regard to their impact[s] on environmental sustainability and the environmental resources availability to poor and vulnerable groups".

Different agencies have championed strategies to foster green growth, albeit using different terminologies, which have been incorporated in various projects with objectives ranging from climate compatible development to low emissions development to development with co-benefits (Figure 1.1).

Figure 1.1 Terminologies Associated with Green Growth



Green growth in the context of this guide is defined as development that fosters environmentally sustainable and socially inclusive development.

Essential Features of Green Growth Strategies

Green growth strategies formulated for a country, state or region should have the following essential features:

- ▶ **Ownership**
 - Support for the proposed strategies within the government.
 - Aligned with the country, state or region's decision-making and budgeting, with scope for integration with existing plans and strategies.
 - Engage and incorporate the diverse stakeholder interests.
- ▶ **Transparency and Analytical soundness**
 - Incorporate transparent and reproducible data with clear documentation.
 - Clearly outline the assumptions and baseline forecasts, if any.

▶ Long term vision

- Model life cycle costs and benefits of adoption of green growth strategies, particularly the technology options
- Prevent undesirable technology lock-ins

▶ Implementation

- Easy to implement by the various stakeholders
- Provide a clear framework for investment support, funding sources and beneficiaries

Figure 1.2 Multiple stakeholders of green growth



Why Green Growth?

Growth in the past and now has been unsustainable and deeply inefficient. It has reached a scale today at which basic growth and social development prospects are likely to be threatened (for example, extinction of an economically important species or drying of river basins), making it imperative to adopt a path that will achieve growth that is environmentally sustainable and socially inclusive. Green growth requires systemic adjustments to better link economic, environmental and social policies and institutions – as far as possible identifying synergies, but also being clear about trade-offs and uncertainties. It is also important to recognise that green growth strategies designed and implemented appropriately have the potential to provide an integrated comprehensive pathway

for long-term, sustainable, climate-resilient, and equitable development, and help access financing from both public and private sources. Thus, green growth entails trade-offs and upfront costs, but also co-benefits and efficiency gains (Figure 1.3). It also requires effective governance, which in some cases necessitates an improvement in the capacity of institutions at the forefront of planning and natural resource management.

Figure 1.3 Co-benefits of Green Growth



Climate Change and Green Growth

In India, going green is no longer seen as a mere option; its importance is reflected in many government and private sector initiatives. One such initiative is the National Action Plan on Climate Change (NAPCC), which sets out the pursuit of development goals that offer growth with long-term “climate change co-benefits”. Through its eight sectoral missions, the NAPCC focuses on key sectors impacted by or impacting climate change, including agriculture, water, forestry, energy and urban planning. In furthering its objectives, state governments were asked to prepare State Action Plans on Climate Change (SAPCC) keeping in view the formulation of an implementation framework for the NAPCC and its alignment with specific development priorities by duly considering impacts, vulnerabilities and adaptation needs at the sub-national level.

Green Growth and Karnataka

Karnataka has a population of over 60 million which is growing at over 2% per annum. It is the eighth largest and fifth most urbanised state in India, with 37% population living in cities. It contributes over 5% to India’s GDP and has been growing at over 7% in the recent past (GoK, 2013). Karnataka’s services sector has been propelled by the IT/ITES boom, which has also been driving economic growth and urbanisation. In the year 2011-12, the share of IT/Bio-tech sectors in the Gross State Domestic Product (GSDP) was 56.3% and the primary sector’s contribution was only 17.2%.

Karnataka’s agriculture is rain-fed to a large extent with 68% of its farmland being without irrigation. Droughts are frequent, a large share of electricity is generated by hydropower, and some regions face severe and perennial water shortage. Further, in terms of areas prone to drought, Karnataka is next only to Rajasthan; 54% of Karnataka’s geographical area is drought prone, with drought affecting 88 of the state’s 176 taluks and 18 of its 30 districts.

Karnataka thus faces several environmental and developmental challenges. Structural inequalities such as low productivity and high disguised unemployment in the agricultural sector have resulted in 55% of the workforce

depending on agriculture that contributes only 17.2% to its GSDP. As a progressive state, Karnataka has actively sought to address these challenges in its Development Vision document, which aims for a 'job-oriented inclusive growth' through sustainable industrialisation and planned urbanisation. The state also has formulated its SAPCC keeping in view the mandate and scope of NAPCC.

Karnataka's SAPCC

Karnataka SAPCC was conceived, leaving aside exceptions, mainly in response to developmental priorities and not just climate change. The "Action Plan" comprises a set of 200 comprehensive action points necessary to enhance Karnataka's preparedness for climate change spanning all the key sectors. Many of these are proposed to help enhance resilience in the pursuit of sustainable development.

31 priority action areas outlined by SAPCC

Agriculture sector

- Restructure agricultural power tariffs
- Create policy body for devising cropping shifts
- Promote dry land farming
- Render theft of sprinkler pipes unviable
- Create a market for indigenous agricultural crops

Horticulture

- Create a market for indigenous horticultural crops

Animal Husbandry

- Formulate a livestock insurance policy
- Expand breeding of indigenous cattle breeds

Water Resources

- Enforce Karnataka Groundwater Act
- Create policy body for restricting groundwater use
- Introduce a groundwater cess
- Devise capital subsidy for RWH structures
- Integrate water resources management in public buildings
- Revise pricing policy for irrigation water

Forestry and Biodiversity

- Estimate the carrying capacity of the Western Ghats
- Respond to invasion of alien species
- Clear forest encroachments

Coastal Zone

- Promote effluent treatment plants
- Act on mangrove replanting

Energy

- Stabilise the grid supply voltage
- Strategise energy audits
- Notify the Energy Conservation Building Code (ECBC)
- Implement NAPCC's Market Transformation for Energy Efficiency
- Scale-up renewables contribution
- Review barriers in wind energy deployment
- Pilot large-scale bio-fuel substitution in the transport sector
- Achieve greater deployment of improved *chulhas*

Urbanisation

- Conduct assessment of MSW management impediments

Other interventions

- Conduct regional research on climate change
- Document adaptation practices
- Introduce SAPCC updation process

Pursuing Green Growth

Developmental goals normally reflect national and sub-national priorities, which are usually implemented under resource and capacity constraints (Stiglitz, 1998). However, a common framework for development and green growth is needed, accounting for these two constraints. Mainstreaming green growth into policies and development activities is therefore widely recommended, especially as part of the development agenda. In traditional planning and decision-making systems, there are well-established processes for national, sub-national and regional economic and sectoral planning. However, these plans are often led or coordinated by a planning ministry, and the sectoral plans are produced by sector ministries, and hence, green growth planning:

- is not always factored into economic and development planning,
- might lack budget allocations,
- is rarely economy wide in its scope, and
- is often relegated to the environmental ministry, which might have less political influence.

Pursuing green growth requires incorporation of the value of natural assets into the economic growth model and developmental planning so as to ensure that the assets continue to provide the resources and environmental services on which the well-being and economic activity is relying on. Transitioning to green growth requires a two-step process:

- 1 The first step requires a shift in focus from “quantity growth” to “quality growth” at the macro-economic level, by strategic policy changes to facilitate long term green growth planning.
- 2 The second step focuses on implementation of the green growth strategy, bringing about changes in physical infrastructure that includes urban design and planning, buildings, transport, energy, water, and waste system so as to re-orient economic activities to align with ecological-efficiency.

In this guide, long term green growth planning (First Step) is discussed in Chapter 2 and the steps to incorporate measures that transform traditional planning and implementation of developmental projects into projects that also promote ‘green growth’ are presented in Chapters 3, 4 and 5.

2 Towards Green Growth for Karnataka

As highlighted in Chapter 1, Karnataka's SAPCC is one of the first attempts to mainstream climate change action- a key component of a green growth strategy- keeping in focus the developmental issues and outlined priority action areas for various sectors. Key recommendations for the various sectors from the SAPCC were presented in Chapter 1. Karnataka's SAPCC has been lauded for the scientific rigour that informed the plan. Taking forward the knowledge from the SAPCC and the development vision identified in various policy documents, the Green Growth Strategy Report for Karnataka (Global Green Growth Institute, 2014) identifies, analyses and prioritises relevant opportunities. This study provides very useful inputs to the SAPCC in terms of suggesting a framework for prioritising the several measures identified in the SAPCC document. Implementation of the SAPCC synchronously with a green growth strategy, however, requires concerted policy action and creation of action plans for specific interventions. In this regard, enhancing technical, institutional and coordination capacity at various levels of the government is very crucial. To meet this requirement, this guide has been formulated with an aim to enhance the knowledge and skills of officers, resulting in their improved capacity- to identify, plan and implement opportunities for green growth and climate-resilient development.

Green Growth Strategy Report

The study was undertaken by a consortium of institutions¹ under Bangalore the Climate Change Initiative- Karnataka (BCCI-K) in collaboration with the Global Green Growth Institute (GGGI), with an objective to build a robust and fact-based green growth strategy that accelerates Karnataka's own progress and serves as a model for other Indian states. This study relied on credible data, strong analytics using computational models and interdisciplinary skills in

science, technology and social science. The study mapped out opportunities for sustainable growth in energy, agriculture, water and forestry sectors. The core work streams encompassed:

- 1 Green Economy Strategy with a focus on sustainable energy planning and development impact of pursuing green growth opportunities in key energy-related sectors such as industry, buildings, transport, agriculture, electricity generation and waste.
- 2 Climate Resilience Strategy that analysed long-term climate change impact and the vulnerability of identified sectors and regions, highlighting key adaptation policies and actions to enhance the adaptive capacity of the most vulnerable regions in Karnataka.
- 3 Financing Strategy for Green Growth that included an assessment of international, national, and state-level funding mechanisms and local institutional capacity requirements.

Approach

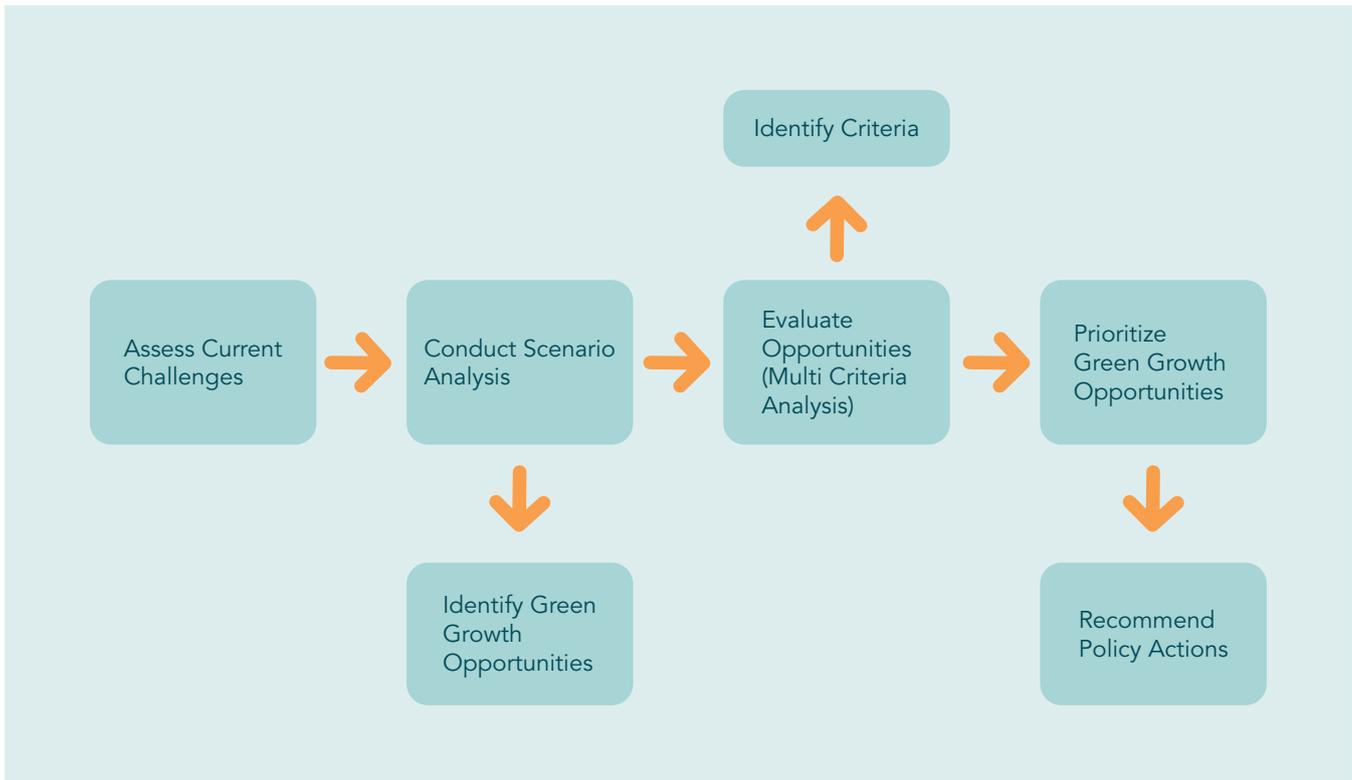
The objective of this study was to assess and ascertain the portfolio mix of the most promising green growth options for Karnataka based on a comprehensive criteria that included economic, social and environmental co-benefits, and ease of implementation (including financial viability).

The salient features of the study included:

- Leveraging relevant work to-date, drawing on the preliminary technical work of the SAPCC
- Supplementing it with the robust modelling and analyses, especially better vulnerability analysis on the

- adaptation side, and full energy system modelling on the mitigation side
- Conducting comprehensive co-benefit analysis necessary to understand the green growth potential of various mitigation and adaptation interventions.
- Convening multiple stakeholder consultations to establish policy priorities
- Building a core set of capabilities through knowledge transfer and capacity building of relevant departments and local institutions

Figure 2.1 Analytical approach for Green Growth Strategy



A long list of green growth opportunities for the priority sectors as outlined in Karnataka’s SAPCC were identified to be modelled in greater detail. A Business as Usual (BAU) and an alternate Green Growth scenario were constructed to examine the relative impact of green growth in furthering the developmental objectives of the state. Based on the ability of these opportunities to meet multiple green growth objectives over the long term, a prioritised set of implementable short term interventions were identified. Karnataka’s sectoral plans, annual reports and policy documents such as the SAPCC were used to determine the prioritisation criteria, which included green growth benefits beyond mitigation and adaptation, such as energy security, job creation, pollution reduction, land and water resource conservation and social inclusion. Finally, an evaluation of the ease of implementation (based on policy relevance, implementation lead time,

relative financial requirements and payback periods) of these key opportunities was also conducted in order to prioritise the opportunities requiring policy focus and/or deeper analysis to support implementation. The detailed technical research was complemented at every step by an extensive consultation with stakeholders.

Results

The analysis of historical trends and BAU projections revealed that future practices based on current policies may not be sufficient to overcome climate vulnerabilities and natural resource and environmental constraints on economic growth. This gap between resources, resilience and growth is bridged in the green growth scenarios

Figure 2.2 Stakeholder consultation approach for Green Growth Strategy



that are specifically focussed on the state’s comparative advantages and development aspirations². The modelling results obtained are translated into actionable strategies through a prioritisation framework that comprehensively evaluates all opportunities on an established criteria that takes into consideration the benefits, financial attractiveness and resonance of these opportunities with Karnataka’s priorities.

Figure 2.3 enumerates the criteria using which green growth opportunities have been segregated into Thrust Areas, Low Hanging Fruits, Strategic Areas and Emerging Areas based on their relative financial, policy relevance and benefit indicators. Figure 2.4 shows the results of the prioritisation exercise for 37 green growth options considered across various sectors. The prioritisation exercise provided clear-cut insights into the relative benefits of various opportunities, and the basis for in-depth exploration of specific opportunities that may be of special interest to the state.

Figure 2.3 Criteria for Prioritisation of Green Growth Options

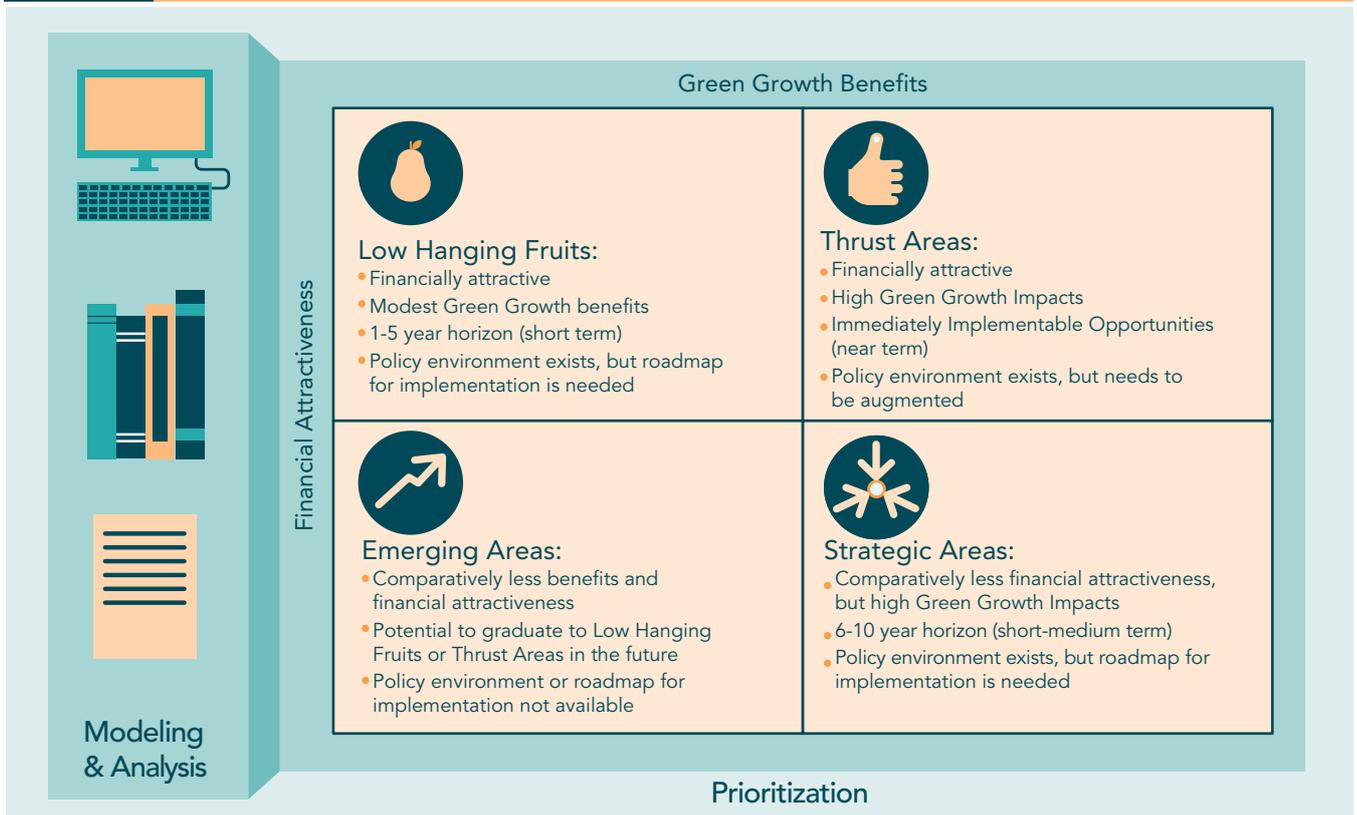


Figure 2.4a Prioritised Climate Change Mitigation Opportunities

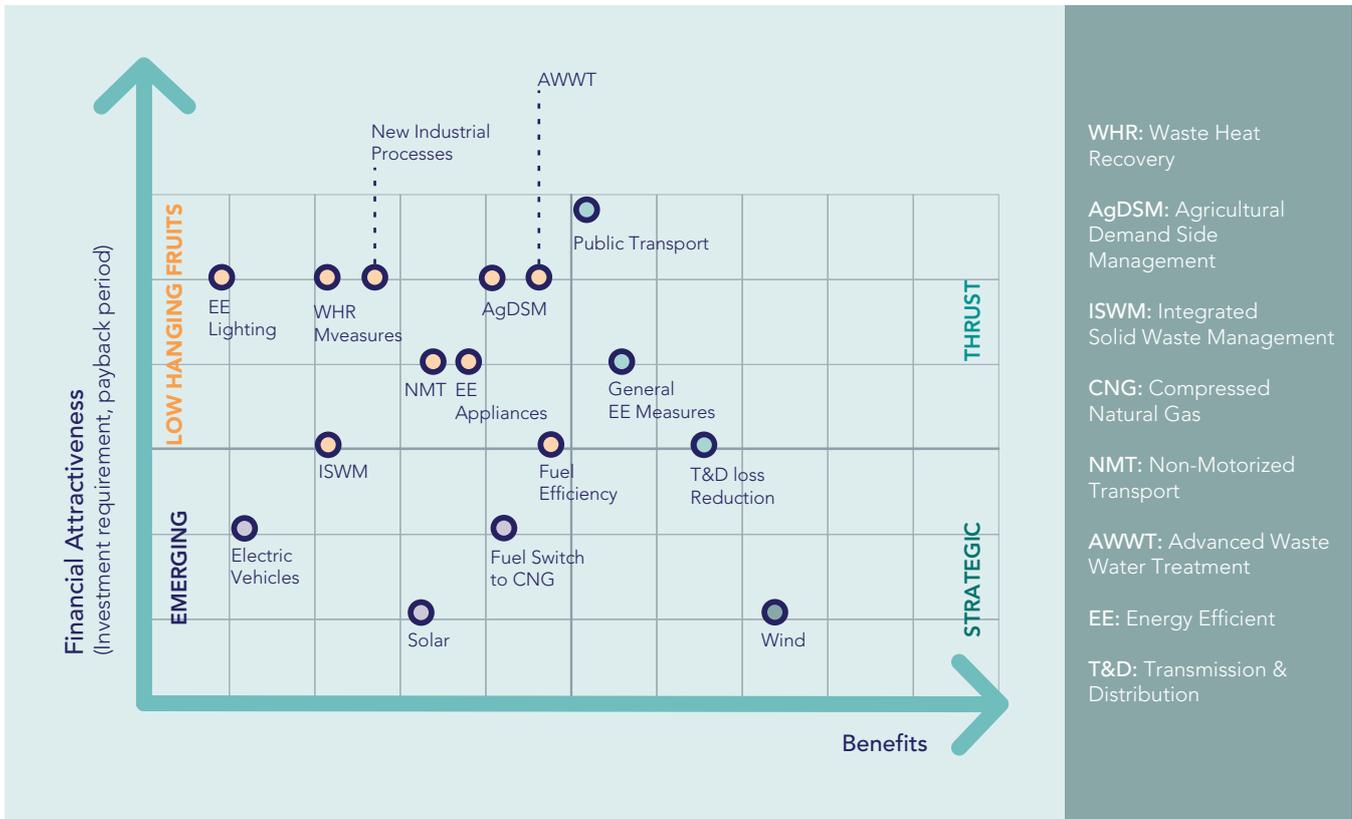
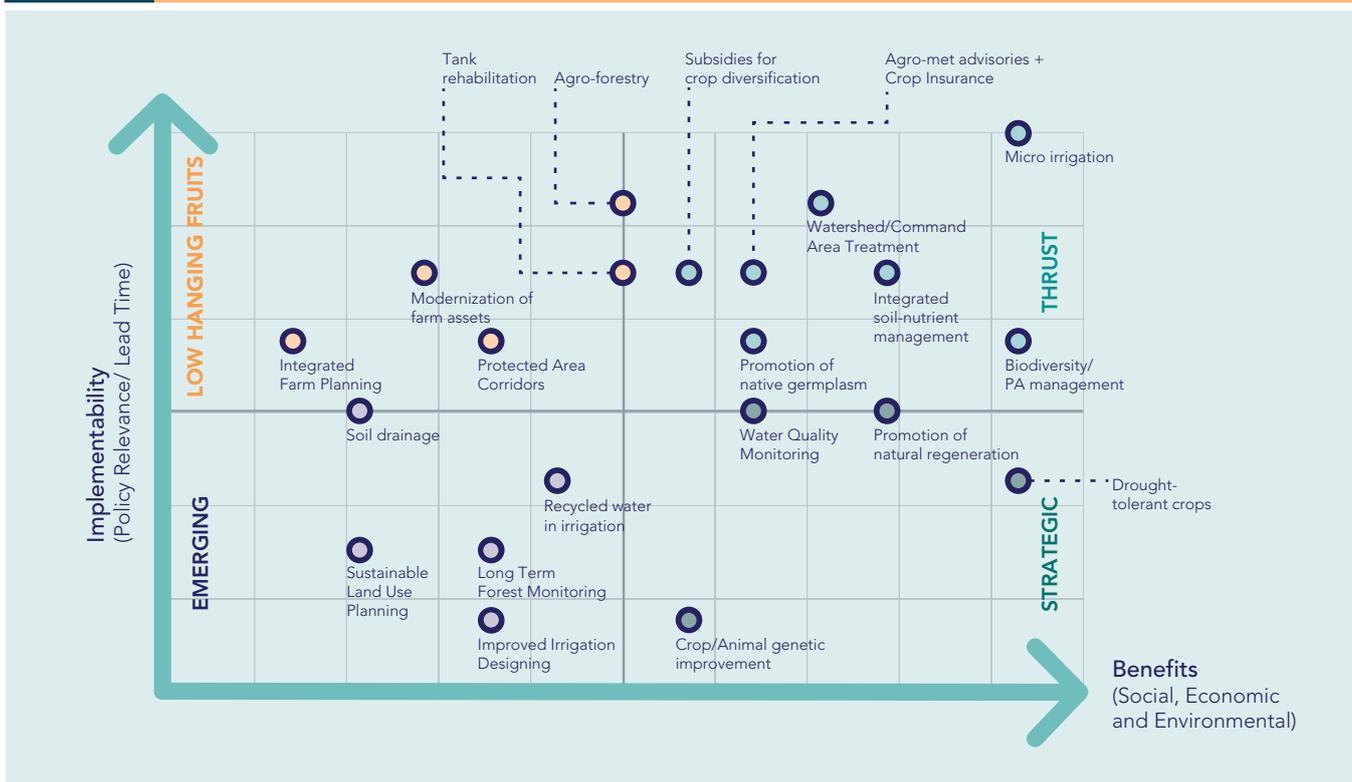


Figure 2.4b Prioritised Climate Change Adaptation Opportunities



From the set of opportunities in Figure 2.4a and Figure 2.4b, the most promising were shortlisted for conducting detailed case study analysis. The shortlisting was based on extensive stakeholder consultation with government functionaries and experts, policy gap analyses, and existing capital and infrastructure (hard and soft). Together, these considerations informed the necessity and desirability of formulating detailed project proposals, policy roadmaps, and capacity building exercises that can help fast-track the realisation of gains from these opportunities.

The detailed case studies were based on Micro Irrigation, Industrial Waste Heat Recovery, Solar and Wind Power, and Electric Vehicles (Global Green Growth Institute, 2014). These identified implementation barriers, policy implications, investment requirements and possible funding sources for these specific opportunities, and a set of concrete recommendations for policy-makers. This paved the way for implementing selected opportunities via development of policy roadmaps or project pre-feasibility studies leading to trial and demonstration.

The next section provides the general principles, detailed steps, and illustrations from ongoing efforts in the state to demonstrate how the users of this guide can help mainstream green growth in Karnataka.

Footnote 1 The institutions included Center for Study of Science, Technology and Policy, Indian Institute of Science London School of Economics- India Observatory, Institute for Social and Economic Change, University of Agricultural Sciences and Indian Institute of Technology Delhi.

2 For details on sectoral and economy-wide modelling insights, please refer to 'Transitioning towards a Green Economy in Karnataka' (CSTEP, 2014), and 'Transitioning towards Climate Resilient Development in Karnataka' (IISc, 2014) and Green Growth Strategy for Karnataka (GGGI, 2014)

3

Planning for Green Growth

Green growth offers the means to ensure synergy between multiple goals as well as local and global benefits. Therefore, it is important to ensure that any interventions aimed at green growth should be acceptable to key stakeholders, and lead to comprehensive and tangible social, environmental and economic benefits. All efforts and approaches to enhancing green growth in developmental projects/programmes or in mainstreaming green growth strategies must adhere to certain principles. A review of green growth strategies adopted by 13 developing countries indicates four basic principles (Dalal Clayton & Bass, 2009):

Principles for Mainstreaming Green Growth Strategies

- **Integrate green growth objectives into mainstream plans and related strategies before initiating green growth projects/programmes.**
- **Acknowledge and engage different interests embodied in existing strategies.** Ensure stakeholder involvement in formulation of green growth vision and strategies to ensure acceptance and implementability.
- **Manage uncertainty and allow for continuous learning and updating of green growth strategy.** There is a need to periodically review and refine green growth strategies. Also needed for managing uncertainty is: capacity building, monitoring and evaluation and dissemination of findings.
- **Promote synergy among multiple goals.** Green growth should be a co-benefit of mainstream developmental projects/programmes, with synergy existing between main project/programme objectives/ goal and green growth benefits.

In this Chapter, we discuss generic features of developmental projects/programmes and also some general principles of greening since these projects/programmes are implemented at different scales and may have varied goals and objectives.

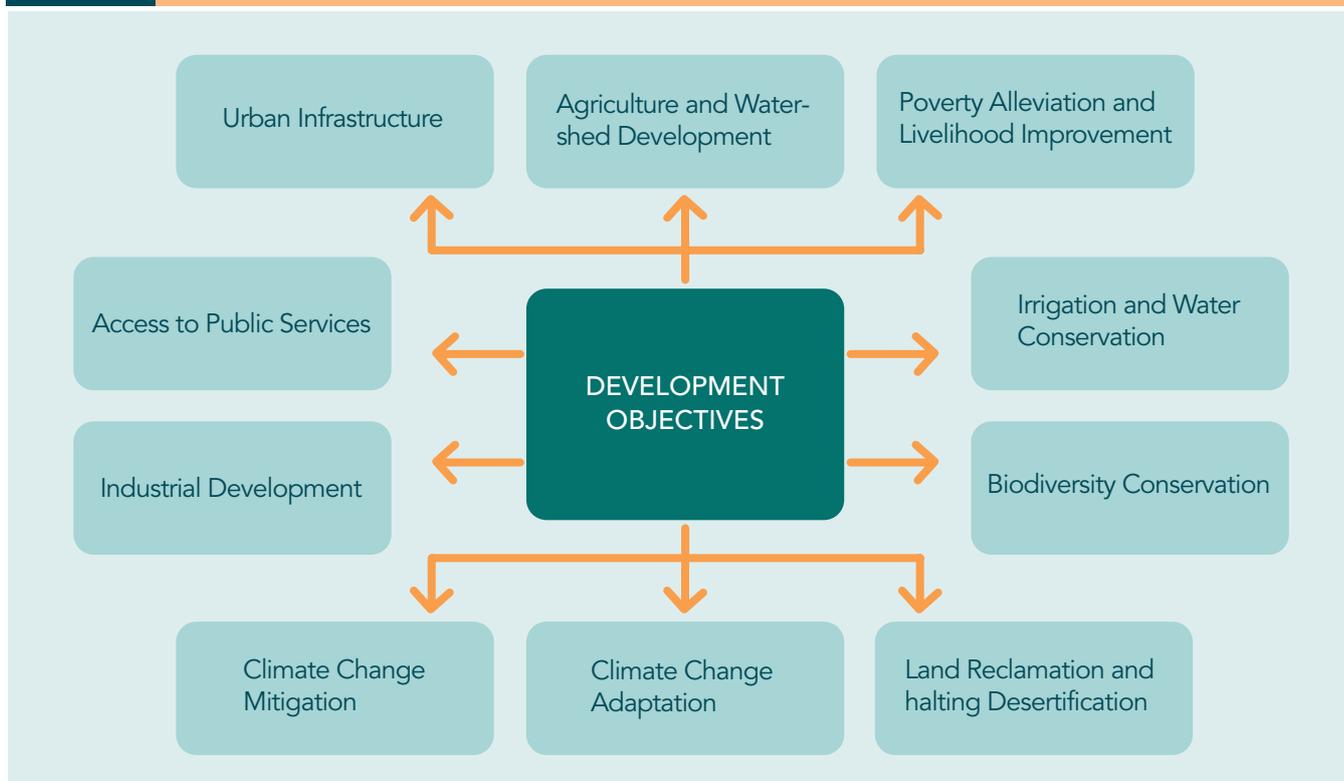
In general, developmental projects/programmes are formulated to address one of the developmental or environmental goals (Figure 3.1) or concerns and they include the following:

► **Agricultural and watershed development including irrigation and water conservation**

There is a large portfolio of agriculture development projects/programmes with a goal of increasing and/or sustaining crop production through increasing area under irrigation, enhancing water supply for rainfed crops, improving water use efficiency and promoting conjunctive use of water.

► **Poverty alleviation and livelihood improvement**

The main goal of projects/programmes in this category would be to increase and sustain incomes from crop production, livestock management and forestry, building community-level assets and providing meaningful employment, skill building and technological upgradation of Medium, Small and Micro Enterprises. Some of the programmes under this category are targeted at underprivileged sections and are implemented to help attain acceptable levels of living through the provision of goods and services such as energy, transportation, sanitation, water, finance, health and education. These have implications on local environment and overall infrastructure. Thus, these projects/programmes are most likely to provide multiple green growth benefits.

Figure 3.1 Goals of Developmental Projects and Programmes - An illustrative list

► **Land development**

The main goal of these projects/programmes is to halt land degradation and improve soil fertility as well as halt desertification.

► **Biodiversity conservation**

The main goal of projects/programmes belonging to this category, would be to conserve biodiversity of forests, grasslands and wetlands.

► **Education and Health**

Initiatives in health and education sectors must be viewed in larger socio-economic and environmental context. These can not only help in building resilient physical infrastructure, but also in inducing green and inclusive choices. From cultivating the importance of green growth thinking in children and college students, to imbibing healthy life-style choices that prevent the incidence and spread of vector-borne diseases, strategies to enhance green growth thrust both depend upon and influence outcomes in health and education.

► **Urban infrastructure**

Projects/programmes aimed at upgrading urban infrastructure offer avenues to improve efficiency and equity aspects. Significant scope exists in such projects/programmes for informed decision making to enhance positive or minimise negative environmental impact.

► **Industrial development**

Such projects/programmes aim to enhance the industrial production base by selectively harnessing competitive advantages or opening up new avenues of production. In both cases, green growth synergies and trade-offs may be stark, but not fully accounted for.

► **Climate change mitigation and/or adaptation**

Projects implemented under this category invariably have either mitigation or adaptation as a goal and seldom synergistically address the twin goal of mitigation and adaptation.

- *Mitigation:* The main goal of mitigation projects/programmes is to directly aim at providing carbon benefits through technical, financial and institutional interventions. Examples of climate change mitigation

projects/programmes include, REDD, Renewable Energy, and Carbon Capture and Storage projects.

- *Adaptation:* Adaptation is an important programmatic priority, especially for developing countries, and its importance is going to increase in coming years. The goal of adaptation projects/programmes is to reduce the vulnerability of communities and natural resources to climate variability and climate change.

It can be seen from Table 3.1 that some of the developmental projects/programmes that have activities linked to water, soil and land also have the potential to impact these natural resources positively or negatively, thereby affecting their ability to provide green outcomes as well as impact

production systems. Such activities also have potential to reduce vulnerability to climate risks by conserving natural resources and providing sustained green outcomes such as groundwater recharge, reduced erosion, soil fertility enhancement, and water conservation. Likewise, industrial promotion and development are linked with increased exploitation of natural resources such as metals and minerals, water and land but at the same time are important to secure livelihoods and provide forward thrust to the economy. Thus, most projects/programmes have multiple outcomes – some planned and some unintended. Adoption of a greening strategy would ensure that developmental projects/programmes implemented would also yield several green growth benefits, as indicated in Table 3.1.

Table 3.1 Potential Green Outcomes from Developmental Projects - An illustrative list

Project Goal	Environmental Benefits	Social Benefits	Economic Benefits
Agricultural and watershed development including irrigation and water conservation	<ol style="list-style-type: none"> 1 Groundwater recharge 2 Soil moisture retention, protection and erosion control 3 Flood control (reduced risk) 4 Provisioning of irrigation for crops 5 Increased crop production 6 Carbon sequestration 	<ol style="list-style-type: none"> 1 Reduced drudgery in water collection, particularly for women 2 Increased resilience to vagaries of climate variability 	<ol style="list-style-type: none"> 1 Improved crop production and income 2 Reduced subsidies for electricity provisioning for groundwater pumping
Poverty alleviation and livelihood improvement	<ol style="list-style-type: none"> 1 Improved tree cover if tree planting promoted 	<ol style="list-style-type: none"> 1 Community-level assets built 2 Skill building and technological upgradation of enterprises 	<ol style="list-style-type: none"> 1 Sustained income from crop production, livestock management and forestry
Land development	<ol style="list-style-type: none"> 1 Land reclaimed for agriculture 2 Improved irrigation availability 3 Improved soil fertility 4 Desertification arrested 	<ol style="list-style-type: none"> 1 Agriculture and livelihood improvement 	<ol style="list-style-type: none"> 1 Increased income and employment
Biodiversity conservation	<ol style="list-style-type: none"> 1 Biodiversity conserved 	<ol style="list-style-type: none"> 1 Flow of services from biodiversity ensured 	<ol style="list-style-type: none"> 1 Sustained income from services flowing from biodiversity

Project Goal	Environmental Benefits	Social Benefits	Economic Benefits
Augmenting clean electricity supply	<ol style="list-style-type: none"> 1 Enhanced access through decentralised energy sources 2 Reduced water dependence and net job benefits 	<ol style="list-style-type: none"> 1 Reduced GHG emissions through fossil-free sources 	<ol style="list-style-type: none"> 1 Higher investment costs 2 Lower fuel and operating costs 3 Energy security through reduced import dependence
Promoting efficient transportation	<ol style="list-style-type: none"> 1 Greater affordability-enhanced access 2 Reduced air pollution 3 Reduced travel time 4 Green job gains in shifting to public transport and through electric vehicle (EV) manufacturing 	<ol style="list-style-type: none"> 1 Reduced GHG emissions 	<ol style="list-style-type: none"> 1 Higher capital and infrastructure costs 2 Reduced oil dependence 3 Impetus to economic activity
Promoting industrial energy efficiency	<ol style="list-style-type: none"> 1 More green jobs and sustainable livelihoods 2 Skill upgradation 3 Reduced local pollution impacts 	<ol style="list-style-type: none"> 1 Reduced GHG emissions 2 Reduced material demand 	<ol style="list-style-type: none"> 1 Industrial competitiveness 2 Reduced fossil dependence 3 Enhanced domestic demand 4 Opportunities for export promotion
Climate change mitigation and/or adaptation	<ol style="list-style-type: none"> 1 Improved carbon sequestration 2 Reduced vulnerability of resources 	<ol style="list-style-type: none"> 1 Improved resilience of ecosystems and dependent communities 	<ol style="list-style-type: none"> 1 Vulnerability of investments reduced 2 Carbon incentives 3 Sustained flow of benefits and incomes

Based on the discussion above, it is clear that most developmental projects/programmes yield multiple benefits which may not be well accounted for. The projects and programmes referred to can broadly be classified as:

- ▶ Projects where **green growth strategies/benefits are part of the project objectives** or the main outputs, but may have potential for enhancing the benefits further;
 - Green growth is recognised and is a part of the project outputs; with activities specifically targeted for delivering green benefits

Climate change mitigation/adaptation projects, particularly those implemented under the CDM programmes have clearly outlined environmental, social and economic benefits that translate to green growth benefits. These projects also have a stringent monitoring framework in place.

- Green growth benefits are estimated and monitored
- ▶ Projects where **green growth benefits are not part of the outputs/objectives but significant unintended co-benefits can be obtained:**
 - Green growth benefits are not recognised and are not part of the project outputs
 - Green growth benefits are not monitored and estimated

Poverty alleviation or livelihood improvement projects that may have a component of promotion of agro-forestry as an alternate livelihood mechanism not only lead to improved incomes but also yield green growth benefits.

- Potential may exist for enhancing green growth benefits
- Additional interventions or practices may be needed to enhance green growth benefits
- ▶ Projects where **green growth benefits are not part of the project outputs and may not be delivering such benefits as even co-benefits** and in some cases may even have negative impacts on green growth.
 - Need to avoid any negative implications for green growth
 - Potential may exist for incorporating green benefits as part of project outputs
 - Dedicated interventions or practices are needed to deliver green growth benefits.

Urban infrastructure projects may sometimes have negative effects on the environment, for example road widening projects may involve removal of trees.

Stages of Project Cycle for Incorporating Green Growth

It is clear that most projects provide an opportunity for incorporating interventions for increasing green growth benefits. The potential stages in the project cycle at which interventions to enhance green growth benefits could be considered or incorporated include.

▶ Project planning and designing stage

This is the ideal stage to identify potential interventions leading to enhanced green growth benefits since it is possible to develop a package of interventions optimising project benefits (in this case developmental benefits) along with green growth benefits

▶ Post project-approval stage

If a project has been approved without any planned interventions dedicated to enhancing green growth benefits but provides an opportunity to incorporate appropriate practices or technologies to enhance green growth benefits synergistically with project goals (e.g. incorporating fuelwood conservation into a Protected Area management project), it is possible to introduce such practices or technologies into the project.

▶ Implementation stage

It is probably the last stage at which appropriate interventions can be introduced. Although the project has started, it may be possible to incorporate a few practices to enhance green growth benefits so long as the practices are synergistic with the main goal of the project (e.g. incorporating mulching, organic manure application, or agro-forestry into an ongoing watershed project).

Who Can Incorporate Green Growth Strategies?

The final decision on incorporating interventions related to green growth benefits and its enhancement is a critical issue, and one or more of the following typically will have the powers to take such decisions.

- ▶ **Project funder:** A funding agency (including national or state government, multilateral banks, or private sector in case of public private partnership) could alert the project developer to the potential for synergy between the project goals and green growth. In fact the project funder is more likely to convince the project developer that most interventions aimed at green growth also have the potential to enhance or sustain natural resources and developmental benefits accruing from them.

- ▶ **Project developer**
The project proponent or developer will be the ideal decision maker given his or her first-hand knowledge of the project goals and objectives, socio-economic and environmental implications, different stakeholders likely to be affected by the project and various activities or interventions planned.

- ▶ **Project evaluator**
Technical experts who review and evaluate the project proposal could also suggest potential interventions for green growth.

- ▶ **Project manager**
Green growth interventions or activities could be incorporated at various stages including the post-project sanction or project implementation stage. Therefore a project manager can also decide whether additional activities could be undertaken for enhancing green growth.

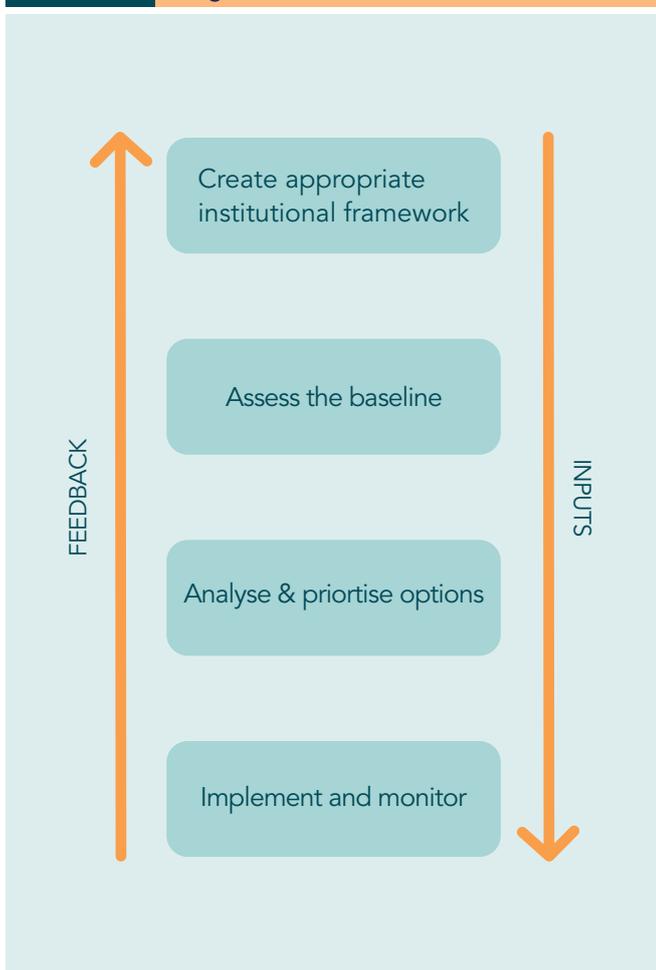
In Chapter 4, a step-wise approach for incorporation of green growth interventions in developmental projects is presented.

4 Incorporating Green Growth Benefits in Developmental Projects

Enhancement of green growth benefits from mainstream developmental projects/programmes would require a systematic approach to ensure optimised delivery of project goals and outputs along with green growth benefits in a synergistic manner. No clearly identified guidelines are currently available for mainstreaming green growth benefits in typical developmental projects/programmes. A broad approach to promoting the concept of green growth is presented in Figure 4.1.

The approach encompasses steps spanning the creation of a congenial policy environment to the establishment of a baseline prior to implementation of green growth strategies and an analysis of the various options. Based on their suitability, cost-effectiveness and efficacy of delivering green growth benefits, various options could be prioritised and implemented and finally monitored for their impact. The approach encompasses an assessment of not just technical interventions or inputs compatible with the project outputs/outcomes but also include the following aspects:

Figure 4.1 Overarching Approach to Greening Programmes



- Assessment of the incremental institutional and technical capacity needs
- Cost implications of dedicated interventions
- Understanding trade-offs and potential synergies between project goals and green growth
- Monitoring impact of dedicated interventions for green growth
- Potential for adaptation to climate change as a co-benefit.

Project Level Screening for Green Growth Benefits

Once an overarching policy and institutional structure is in place, the next crucial step is to ensure that the activities and strategies for delivery of green growth benefits are incorporated in mainstream developmental projects. Detailed steps for screening at the project level are presented in Figure 4.2.

Figure 4.2 Approach for Scoping Greening Potential of Developmental Projects

The steps outlined in Figure 4.2 could be adopted for screening projects belonging to any of the sectors such as agriculture, water, forests and energy. Once the sector is identified, the next crucial step is to identify projects within the sector. At the outset, it is important to recognise that not all projects require incremental investment and

technical capacity to deliver green growth benefits. Those that have the potential to deliver will have to be designed and implemented in a certain manner, with implications for technical and financial requirements, which is largely a limitation in most projects.

Step 1: Policy landscape analysis and Project Identification

There is a need to adopt certain criteria while selecting projects for green growth. The main criteria for selecting projects for green growth include:

- project should be rooted in current policy context, fitting with the priorities of the government,
- it should offer the potential for green growth directly or indirectly and
- green growth should be synergistic with the project's socio-economic or environmental goals.

A project with a broad goal of modernising public office spaces could also include retrofitting with energy efficient appliances and improving building insulation.

Step 2: Screen the Project Outputs

Every project is formulated with some specific objectives to ensure the delivery of certain broad outcomes and outputs. Most projects have multiple outputs related to objectives that are environmental (such as reducing soil erosion and water conservation through better soil management practices, reducing stress on local water and environment by investing in clean energy sources), socio-economic (increasing income and employment), and institutional (capacity development). A good understanding of the expected outputs is critical for decisions on interventions for green growth since these will have direct or indirect implications for the project outputs. In projects that are natural resource based, no drastic alteration or modification of the outputs may be required to obtain green growth benefits. Thus it may be possible to incorporate the objective of green growth even during post-approval stages of the project, prior to implementation.

STEP 1

Identify all the outputs of the project

STEP 2

Categorise the outputs

- Social
- Economic
- Environmental
- Capacity building, etc.

STEP 3

Identify whether the outputs deliver direct or indirect green growth benefits

A watershed development or agricultural development activity will have several project activities formulated to deliver multiple outputs. There is a need to clearly align the targeted green growth benefits with the project outputs, particularly environmental outputs.

Step 3: Assess Project Outputs for Green Growth

Not all project activities have the potential to deliver green growth benefits. There is a need to categorise and screen project activities and outcomes for their potential to deliver green growth benefits. The following approach could be adopted for identifying and selecting outputs for considering and enhancing green growth benefits.

STEP 1

Categorise outputs based on their potential to deliver green growth benefits

STEP 2

Explore and identify the possibility of including additional outputs. It is desirable to add additional outputs aimed at enhancing green

growth benefits synergistically with other project outputs. Such outputs may require

- potentially incremental interventions
- monitoring of the green growth benefits

STEP 3

Identify the activities or practices required for each of the outputs leading to direct or indirect green growth benefits.

An urban infrastructure project may have multiple project activities with no scope for alignment with delivery of green growth benefits beyond immediate goals. However, such a project may offer indirect opportunities such as recycling materials and relying on local skills and products.

Incorporating specific activities or interventions in a cost-effective and synergistic manner may potentially require modification of the project design, its implementation and monitoring, and also incremental technical and institutional capacity for certain categories of projects. There are some projects with activities already incorporated to realise or enhance green growth benefits. Such projects may not require any significant incremental investment or technical capacity. However, it is likely that a monitoring framework may have to be put in place to measure and assess the impact of the interventions. The various interventions could be grouped in the following manner:

► Biological interventions

These include enhancing the vegetation cover (agro-forestry) and incorporating organic matter into soils (application of compost or mulch), where benefits are both environmental as a result of improvement in soil quality, and economic as a result of enhanced productivity. As a result, social benefits in the form of improved income and employment generation are achieved.

► Physical interventions

Such interventions could include construction of physical structures for soil and water conservation, such as farm ponds, contour bunds and check dams, where green growth benefits are accrued indirectly in the form of enhanced growth of crops or trees (environmental).

► Socio-economic interventions

Certain projects such as industrial land acquisition and hydropower development may involve displacement of population and erosion of means of livelihood. In such cases, plans for rehabilitation, securing livelihoods, ensuring favourable gender outcomes, etc. become crucial to mainstreaming green growth by overcoming the trade-offs in business as usual scenario.

► Institutional and capacity-building

Interventions such as skill upgradation of personnel associated with electricity distribution companies and capacity building at institutional levels can help in better accounting and monitoring of energy use, which is crucial for efficient planning. It can generate spill-over benefits by reducing leakages and losses, building investor confidence, and increasing the resilience of the energy system.

Step 4: Analyse and Prioritise Green Growth Options

Green growth could be achieved in all natural resource based projects such as those being implemented on cropland, grassland, forestland, and degraded forestland as well as arid, irrigated, and rain-fed croplands. It is also possible to realise green growth through interventions in the energy and transport sectors. Different green growth options or strategies are relevant to different categories of projects, while some may be relevant to only one category (e.g. shelterbelts for arid croplands). The following steps could be used in identifying potential interventions for enhancing green growth benefits:

STEP 1

Identify outputs and interventions with potential to deliver green growth benefits

STEP 2

An assessment of green growth interventions to be included in the project involves identification of interventions that may directly or indirectly contribute to green growth benefits

STEP 3

A given outcome could be achieved through multiple activities. Obviously all activities that could potentially yield a specific outcome cannot be adopted in any one project owing to constraints of cost and labour. Therefore, appropriate criteria are necessary to select interventions to be adopted in a project. Such criteria include:

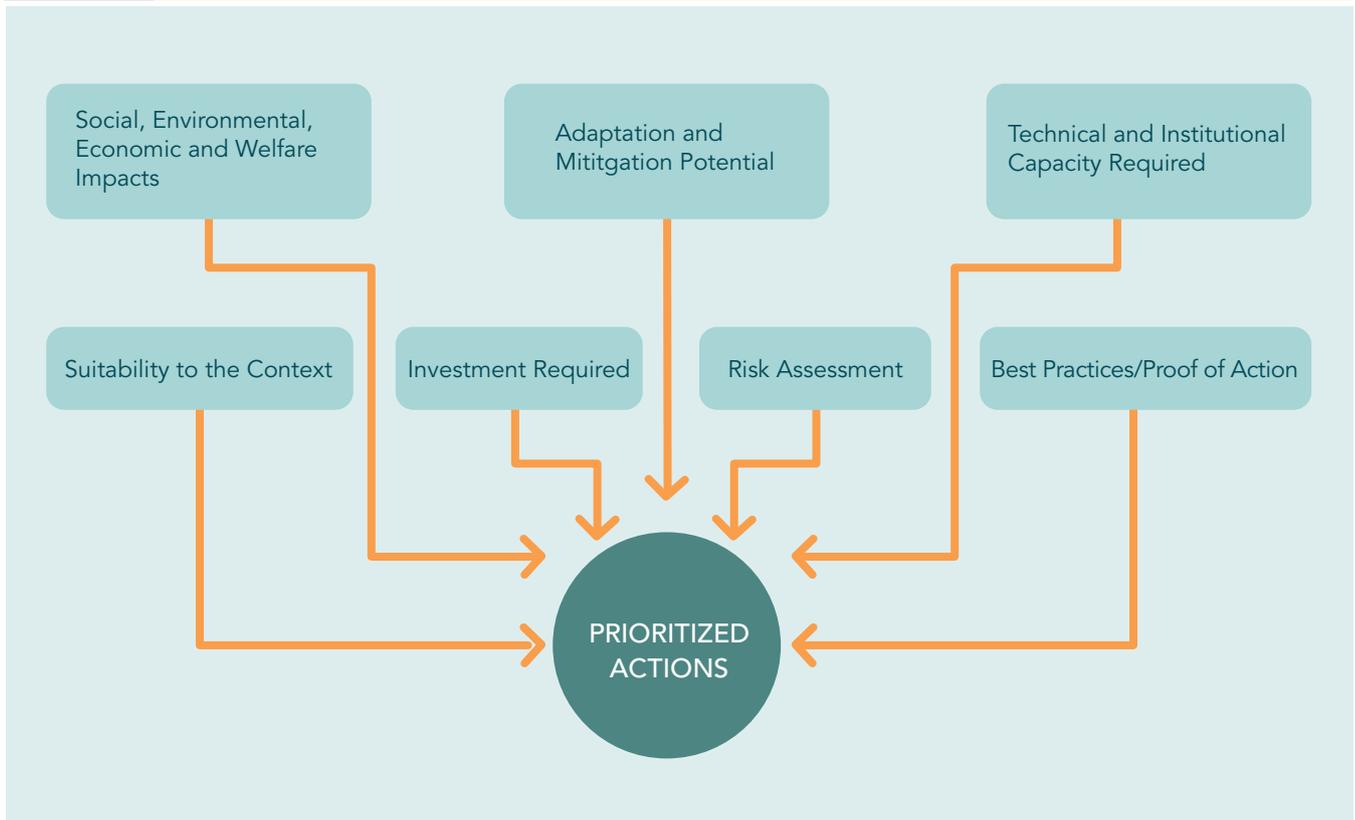
- Potential to enhance green growth
- Potential to contribute to the main outcomes of the project
- Suitability for the region and project
- Cost implications of incorporating an intervention and benefit-cost ratio.

lessons are learnt. To summarise, prioritisation of green growth actions should be based on (Figure 4.3) (Global Green Growth Institute, 2014):

- ▶ Common criteria, defined to reflect a projects and more importantly the State's overarching "Green Growth Vision".
 - BAU scenario provides a common reference point for evaluating each option.
- ▶ Analysis of project impacts and costs should include both short and long-term impacts.
 - Prioritisation criteria should cover a relatively broad set of metrics that encompass environmental, social, economic and even GHG mitigation potential, reflecting the scope of development priorities.
- ▶ Approaches/tools that have been driven by stakeholder-led process to capture both the quantitative and qualitative insights
 - Prioritisation, ultimately, is a political decision; transparency and good communication between analysts and decision makers is critical.

A watershed development project may offer several opportunities for enhancing green growth benefits, all of which cannot be adopted. If promotion of agroforestry is the chosen intervention, then the choice of species will be dependent on availability of seedlings or seed material and its suitability to the project site. Also, the cost of raising seedlings should not be very high.

There is a need to accord high priority to interventions that, if incorporated, have the potential to meet a project's development objectives as well as reduce environmental impact and resource degradation. This could be achieved through an iterative process that evolves over time as

Figure 4.3 Criteria for Prioritising Actions Delivering Green Growth Benefits

Step 5: Assess Implications of Green Growth Interventions

Incorporation of green growth interventions could be at the project planning or designing stage and, in a few cases during project implementation stage. A project cycle involves conceptualising the problem and identifying broad goals to address an identified problem, designing interventions, implementing activities, monitoring, evaluation, and reporting. Incorporation of additional activities related to green growth in a project has implications for different phases of the project cycle. It is likely that some of the proposed interventions have minimal or no additional implications for the technical, institutional, or financial aspects of the project cycle. However, there could be other project interventions that will have incremental technical, institutional, and financial implications for the project.

Institutional and technical capacity implications

The incremental activities required for enhancing green growth benefits from projects may or may not

be significantly different from the normal activities in any typical developmental project. However, additional technical and institutional capacity may be required for:

- ▶ Identifying appropriate green growth interventions to maximise benefits compatible with the project goal and project location
 - ▶ Promoting synergy between the project's developmental or environmental outputs and green growth interventions
 - ▶ Designing a cost-effective package of practices to enhance green growth benefit
 - ▶ Assessing the technical capacity needed for supervision of implementation of project activities according to technical specifications given in the package of practices
 - ▶ Monitoring green growth interventions under baseline and post-project implementation
- Identifying and pursuing sources of public and private

► financing.

Cost implications

Enhancement of green growth benefits from developmental projects could involve modifications to the activities already included in the project or incorporating new activities and practices. This could include the cost of procurement of inputs or employment of labour and technical expertise for monitoring. Three scenarios of green growth enhancement in developmental projects with cost implications could be considered. The following approach could be adopted for assessing the cost implications at project preparation, implementation, and monitoring stages:

STEP 1

Select the interventions including monitoring.

STEP 2

Identify the inputs, labour and technical expertise required for additional green growth interventions and monitoring, including human resource.

STEP 3

Determine the quantities of inputs required for the project on per hectare or per unit basis and for the whole project area and the number of technical staff for supervision and monitoring.

STEP 4

Estimate the cost of each of the inputs and staff for the total project along with the monitoring costs.

STEP 1

Identify the main goals of the project.

STEP 2

Identify the economic, environmental, and social benefits or outputs incorporated in the project.

STEP 3

Identify any new or additional economic, environmental, and social benefits that may be accrued from activities leading to green growth in the proposed project.

STEP 4

Measure, monitor and estimate the economic, environmental, and social benefits using standard methods.

Implications for monitoring

Monitoring of green growth benefits is required to assess the additional benefits accruing in a project as a result of implementation green growth interventions, as well as to estimate the net benefit due to the project interventions over a no-project or baseline scenario condition.

A robust monitoring plan, depending on the type of project is likely to involve measurements (field and laboratory measurements, especially for natural resource-based projects), recording, modelling, calculations or estimation, and reporting of the green growth benefits.

Socio-economic and environmental implications

Most projects have multiple goals, delivering economic, environmental, or social benefits or a combination of these benefits. Once green growth interventions are incorporated in such projects, there is a need to quantify the benefits. A matrix of socio-economic and environmental benefits, including mitigation and lower vulnerability to climate change, leading to green growth could be prepared. The following approach could then be adopted for identifying and quantifying the potential economic, social, and environmental benefits:

Step 6: Quantify Green Growth Benefits

Quantification of green growth benefits is possible only if a baseline is established. Therefore, it is very essential for projects incorporating green growth strategies to quantify benefits under baseline scenario. In projects which already have green growth strategies in place, but are unrecognised, targeted monitoring systems will be required. Once a monitoring and evaluation system is in place to track the impacts of green growth interventions, the same will have to be translated into a set of metrics encompassing economic, social and environmental aspects. It is important to ensure that the green growth

indicators selected are analytically sound and measurable, such as:

Social indicators: A green economy can contribute to societal progress and human well-being by ensuring investment towards green goods and services that can help meet the basic needs of the poor such as access to clean energy, safe water and adequate sanitation or it could help strengthen human and social capital. Some of the indicators of progress and well-being that could be considered include the extent to which basic human needs are fulfilled, level of education achieved, health status of the population, and availability of, and access by the poor to social safety nets.

Indicators of resource efficiency (environmental): A key benefit of incorporating green growth interventions, especially in the medium and long term, is improved resource efficiency in relative or absolute terms. Principal indicators include those pertaining to the use of materials, energy, water, land, changes to ecosystems, generation of waste, and emission of hazardous substances related to economic activities (UNEP, Briefing Paper, 2012).

Economic indicators: A green economy is first and foremost about transforming the way economies grow. Currently, growth is typically generated from investments in high emission, heavily polluting, waste generating, resource intensive, and ecosystem damaging activities. A green economy requires investments to shift towards low carbon, clean, waste minimising, resource efficient, and ecosystem enhancing activities.

Step 7: Communicate the Benefits

It is a must to adopt certain good practices for communicating the benefits of green growth interventions (Global Green Growth Institute, 2014). They involve:

- ▶ Establishment of monitoring and evaluation systems that track how green growth interventions are impacting the development goals and plans of the project
- ▶ Emphasising synergies among development outcomes (for example, creation of jobs, conserving natural resources, enhancing livelihoods)

- ▶ Translating the overarching green growth vision into a concrete set of social, economic, and environmental metrics
- ▶ Engaging credible and trusted messengers for presenting robust, tailored, and balanced evidence-based messages.

Thus, it is clear that there is scope and opportunity to incorporate green growth benefit yielding activities or strategies in most developmental projects, without compromising on the key developmental goals of projects. It is also important to understand and recognise that inclusion of such activities could only have implications on monitoring and additional technical knowhow required for such monitoring, without any cost implications. Only in very few projects, there could be additional cost implications.

5 Developing Projects and Implementation Roadmaps

Chapter 4 outlined the general principles to be followed for greening developmental projects. Emphasis was placed on a step-wise approach to carefully select project activities based on their capacity to deliver green growth. In these cases, the said developmental project may have already been identified as being necessary to fulfilling certain policy targets and its scope may be suitably modified to incorporate the benefits of green growth (or neutralise any trade-offs) at various stages of the project cycle. However, certain projects may be conceived and designed specifically for green growth benefits. These would explicitly address the social, economic and environmental pillars of green growth by virtue of their design.

In Chapter 2, we discussed the **Green Growth Strategy for Karnataka** report and the criteria it uses for evaluating green growth opportunities and their prioritisation for future action. Because these opportunities were arrived at from the SAPCC³ guidelines, a careful consideration based on quantitative and qualitative evaluation of their impact on green growth was necessary for identifying the most promising projects. The prioritisation exercise required a preliminary assessment of the relative co-benefit and cost implications of these options.

Next, the projects identified to be taken up by the state on priority were analysed further and presented as detailed case studies (Global Green Growth Institute, 2014). The case studies have helped to identify policy, institutional, financial and technological gaps that need to be bridged in order to benefit from the selected opportunities. Further deliberations on these have led to actions such as the initiation of a pilot design for Electric Buses in Bangalore and development of a policy roadmap for Micro-Irrigation (MI) in Karnataka.

Figure 5.1 Process followed for Choosing Green Growth Opportunities for Implementation



Rationale for Choosing Projects for Implementation

Figures 2.4a and 2.4b show the categorisation of green growth opportunities into Thrust Areas, Low Hanging Fruits, and Strategic and Emerging Areas (Global Green Growth Institute, 2014). The basis for choosing Electric Buses (EBs) for Bangalore was on account of the criticality of public transport for enhancing access to mobility and reducing travel time, and the potential of EVs for improving air quality in urban Karnataka, especially Bangalore. Despite having the largest fleet in the country of 6,775 buses, 25,000 new private vehicles are added in

Bangalore every month, worsening the congestion and travel time indices over the years. The need for EVs is also underlined in the fact that 50% of Particulate Matter (PM2.5) emissions in Bangalore are directly from the transport sector. The presence of an EV manufacturing industry in Karnataka also means that diffusion of EVs will help generate jobs within the state. So the project was deliberately aimed at targeting both EV adoption (emerging area) and improving public transport (thrust area). The national level policy landscape is also favourable to the adoption of more public transport and EVs with schemes such as the National Electrical Mobility Mission Plan (NEMMP), Faster Adoption of Hybrid and Electric Vehicles (FAME), Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and National Urban Transport Policy (NUTP).

In the case of climate resilience strategies, it is clear that state would drive the initiatives rather than the private sector. So apart from green growth benefits, the relative implementability and existence of strategic policy focus on particular opportunities dictate the choice of projects to be taken up for implementation. In this case, micro-irrigation emerged as the most lucrative opportunity for the state to take up, on priority. Karnataka is the second most drought-prone state in India, and is likely to spend nearly INR 400 billion by 2020 on electricity subsidies for water pumping. There has been a net decline in groundwater availability in the past decade (EMPRI, 2012; EMPRI and TERI, 2012), with average heads dropping by almost ten times in some districts. Moreover, use of fertigation technologies with MI can lead to 60-80% fertiliser use efficiency. This is especially relevant for Karnataka as it ranks among the top five states having the highest nitrate contamination in drinking water. While successive state budgets have focussed on enhancing coverage under MI, a structured programme-based implementation (along the lines of the Surya Raitha scheme, for example) of MI is lacking. In this regard, the Chief Minister of Karnataka in his budget speech of 2015-16 announced that a MI Policy for the state will be formulated.

The following criteria could be used for choosing the most promising green growth projects amongst the various options available:

1 Area(s) of Intervention

- Rural or urban
- Private or public sector

- Adaptation or mitigation

2 Benefits to key target groups

- Deprivation gaps - scope and scale
- Impact of direct versus indirect interventions
- Addressal of vulnerabilities among the socially and economically downtrodden

3 Policy environment

- Existence of a conducive policy environment
- Ease of implementation
- Alignment with the state's strategic vision

4 Overall contribution to green growth

- Social - Equity and Access
- Economic - Employment, investment and growth
- Environmental - Water and energy efficiency, reduced local and global emissions, lower chances of adverse health impacts

5 Availability of finance

- Loan or Grant schemes from central government or private finance institutions
- Existence of complementary policies and financial incentives at national level
- Targeted development/climate funds from bilateral and multilateral finance institutions for specific interventions.

Choice of Implementation Mechanism

The next question pertains to choosing the route via which green growth projects are to be implemented.

- 1 Certain green growth projects may involve relatively untested technologies and financial and institutional mechanisms, which first need to be deployed on a smaller scale to be able to monitor performance and generate precedents for scalability and replicability.
- 2 Others may comprise proven technologies and institutional mechanisms that have significant green growth benefits, but have not become popular due to prohibitive costs, limited implementation capacity and/or lack of programmatic focus.

Deployment of green growth solutions therefore requires a considered approach. In case of the former category of projects, it may be best to conduct pilot tests in a controllable environment so as to monitor selected technologies and application frameworks. There may be behavioural shifts implicit in the adoption of certain technologies; such risks can be mitigated through pilot projects.

For the latter category of projects, a careful consideration of the causes of non-scalability of proven technologies by examining the context - benefits, costs, actors, institutions and incentive mechanisms - can lead to the formulation of policies and implementation roadmaps that seek to adequately address the barriers to adoption of proven methods and technologies to foster green growth.

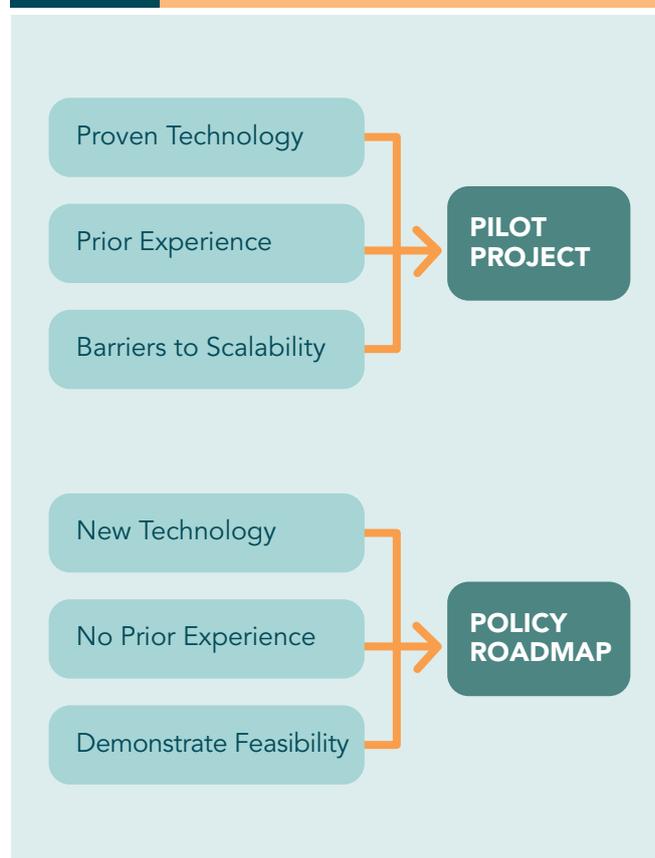
The EB project for the Bangalore Metropolitan Transport Corporation (BMTC) is an example of the first category of projects. Policy thrust towards EV adoption is a relatively recent trend in India. Autonomous uptake of EVs has been a major challenge due to higher capital costs than conventional petrol or diesel vehicles, low battery life, low awareness about the technology, and lack of adequate charging infrastructure. Moreover, EVs can be purely battery-based (pure EV) or contain both an internal combustion engine and a battery (hybrid EV). The latter can be further classified into mild, parallel, or series-parallel based on how the two power sources are connected. Therefore, the choice of technology to promote becomes crucial, and depends upon the context.

Despite the favourable performance of EVs versus other kinds of vehicles in terms of total ownership costs, pollution, and energy security, their uptake has been very limited, due to reasons cited earlier. In such a case, a pilot project offers the best mechanism to study various parameters that could help enhance the scalability of EVs in India. Public transport corporations play a major role in solving many transport-related problems in urban areas. Therefore focussing on EBs in specific helps them to lead from the front and substantially reduces transaction costs, performance, financing and other risks associated with an EV pilot project.

On the other hand, MI is a proven practice in agriculture that leads to significant water savings, improved productivity, lower farm inputs, and preservation of soil micronutrients. With two-thirds of Karnataka's land mass under agriculture, declining water availability, and

unsafe levels of nitrate pollution in several districts due to fertiliser over-use, the state has placed clear emphasis on MI, with budgetary provisions in 2014 for subsidised distribution of drip and irrigation sprinklers for a total cultivated area of 28,000 hectares. While Karnataka is already one of the best performing states in terms of MI, there is considerable gap between the current and targeted irrigation potential to be bridged. In fact, the State Budget of 2015-16 expressly announced that a MI Policy will be formulated. Accordingly, a working group has been set up to deliberate on the implementation roadmap for the policy. Because precedent and a conducive policy environment for MI already exist, an implementation roadmap is preferable to conducting a pilot project, unlike in the case of EBs. Preliminary analysis has indicated that MI systems coupled with solar pumps could be most effectively deployed in areas under sugarcane crop, using various models to bridge financial viability gaps. Due to limited resources and competing priorities, the state could proceed by tapping the most congenial spaces for MI deployment first. Such an implementation strategy is most likely to achieve maximum impact with least costs.

Figure 5.2 Choosing the Implementation Mechanism



Key Elements of Project or Programme Proposals

Once the mode of project implementation is finalised, project design documents or policy implementation roadmaps need to be prepared. A project and a programme may differ in scope but not necessarily in their overall objectives. In general, a project is relatively limited in its scope - the proposed set of activities and outputs, duration and budget - as compared to a programme. In the two interventions for Karnataka, EB qualifies as a project, while MI is a programme. Whereas the EB project is effectively focussing on technology deployment and testing (through pilots) in an uncertain and relatively unfamiliar environment, MI is attempting to influence the wider, yet much more familiar environment, where policy focus and precedents exist. Even then, both MI and EV are trying to create similar levels of impacts in their respective domains. Henceforth, the term 'project' will be used to refer to both projects and programmes unless a distinction is made for illustration purposes.

Whether a project or a programme is proposed, the proposal document should clearly provide:

1 Context

This would provide a description of the starting situation of the region in which the project/programme is proposed. This helps in building the case for a particular project, and narrating the barriers that the project seeks to overcome. These barriers can be developed into indicators later, whose status is tracked before, during and after the project. These indicators can help in outlining targets for the project and streamlining monitoring and verification (M&V) of project activities and outputs.

For example, the context of the EB project would indicate the status of public transport in Bangalore, role of chief actors including BMTC and the Urban Development Department, performance of existing BMTC fleet on various parameters, assessment of current and future mobility requirements and other key issues (such as air pollution) that EB deployment will help to resolve. On the other hand, the MI project would lay out the set of challenges for improving the irrigation situation in Karnataka in the wake of water availability and pollution concerns, over-fertilisation,

electricity subsidies for underground pumping, etc.

2 Interventions

As a part of the context or in a separate section, an overview of proposed intervention(s) should be provided. This should comprise the details of alternatives available, the pros and cons of each, and proceed to explain why a particular alternative is being chosen over the others. It should also be mentioned whether the specific intervention (or any sub-intervention or alternatives) have been tried out in the host country or region in the past, and the reasons for their success or failure. This will help to clarify how the project is effective in bringing about a change based on precedent from or outside the region. In other words, it can provide a starting point to answering the question "What is unique about this project"?

Both the EB and MI projects offer technology-based interventions which have been tried out on different scales with varying degrees of success. The respective proposal and roadmap would indicate which specific technologies have been engaged in the past, how they have fared, and the case for engaging these technologies in a more intensified form. If alternatives exist within the same technology - such as drip and sprinkler based MI or pure and hybrid EBs - a clear indication of which alternative/s will be engaged and why should be provided.

3 Objectives and Targets

It is important for the proposal to clearly communicate the objective of the project. Usually, the objective is singular and seeks to communicate the issue being addressed at the most fundamental level. The objective of both the MI and EB projects is therefore to attain the multiple green benefits they bring upon successful achievement of their respective targets.

Targets pertain to the set of concrete changes that the project wishes to bring about. This could imply the number of EBs being deployed by BMTC, or the amount of irrigation potential created by the MI project. Targets can be both holistic and nuanced, and must adhere to timelines set by the project.

Sometimes, goals and objectives may be used interchangeably in the proposal. But the term

'goal' may be more aptly used to communicate the high-level impact of the project. For example, 'To make Karnataka a model state in terms of MI or EB adoption' would qualify better as a stated goal of the respective projects, than as an objective. As in case of the objective, the goal of the project should ideally be an articulation of a single overarching vision.

4 Actors and Relationships

The project design, key actors responsible for implementing the project and their respective responsibilities should be outlined here. This helps to provide the exact roles of participating individuals, institutions and agencies, and the expectations from them. The project may be divided into phases or work-streams with clear-cut timelines for deliverables. For example, the EB and MI projects will focus on key stakeholders and their responsibilities - research partners, vendor agencies, implementing agency, monitoring agencies, funding partners, and overall coordination/ steering committee/s for various activities.

5 Activities and Outputs

This section should provide a detailed account of each activity involved in the project and the outputs expected. The outputs should be accompanied with timelines and phased in a way such that the overall project timelines are adhered to. Some activities may be undertaken simultaneously, while others may be sequential in nature, depending on whether the outputs of one activity are required to feed into another. The actors responsible for each activity should draw up a work-plan clearly highlighting their expected outputs and the nature and duration of support required from other project partners.

The activities in the EB project involve technology and vendor selection, analysis of loads and routes, analysis of the transport corporation's fleet and finances, deployment of EBs, creation of charging facilities, safety and other failsafe mechanisms, monitoring of cost and revenue, and other variables of interest, etc. These would necessarily come under the purview of one or more project partners, and may involve complementarities. In such a case, a steering/ coordination committee can play the role of ensuring that the activities and outputs are synchronised with the overall project targets and timelines.

6 Expected Outcomes

The success of a project depends on whether it is able to influence the starting situation in the region in the manner that has been proposed. This will reflect in the project outcomes after the outputs have been delivered in a timely and consistent manner. Certain outcomes may become apparent during the project implementation phase, whereas others may arise immediately after the project is successfully completed, and some other may have a longer lead time due to inherent reasons. In the latter case, the outcomes may also be dependent on how responsibly the tangible and intangible assets created during the project are preserved and enhanced by the ultimate beneficiaries or guardians of those assets. Such risks for the project must clearly be spelled out in the proposal, and mechanisms to prevent such risks should be outlined. This would help to demarcate the sphere of project influence and the exogenous conditions necessary for its success.

The indicators referred to in the Context section can be used to judge the project outcomes and its ultimate success. In the case of the MI project, agricultural productivity, water availability in the target region, number of beneficiaries, underground water head, levels of nitrate pollution and electricity use for water-pumping can be used as objective indicators for gauging success. Similarly, a different set of indicators will be used based on the key issues identified and variables sought to be influenced by the EB project.

The preceding discussion highlights the importance of having robust M&V mechanisms for tracking project outcomes. Establishing credible baselines helps to communicate the need for proposed interventions and the value proposition for interested donor and financing institutions. The M&V process may continue even after all the outputs of a project have been delivered. M&V must also figure in the overall project budgeting requirements and involve independent third party verification.

7 Project Costs and Financing

Perhaps the most important aspect of a proposal is the value proposition they offer. Green growth projects usually entail high up-front investment costs and bring multiple benefits, some of which may be difficult to monetise. It is nevertheless useful to use indicators or measures of success to highlight the same. The

investment costs, in terms of technology procurement and deployment, infrastructure requirement, operation and maintenance costs, management costs, capacity building and personnel costs, M&V costs, and other costs and overheads should clearly be spelled out.

A clear plan of how these resources will be organised is indicative of sound project planning. The sources of finance can include own funds, policy-based incentives at state and national levels, bank financing,

and loans and grants from bilateral or multilateral development finance institutions that support green growth projects.

Most green growth projects may involve subsidy-based components to bridge viability gaps, the complexity of which is determined by the agents who are the recipients of the subsidy. For example, if BMTC procures EBs, then the subsidy for the same will be recommended by the Department of Heavy Industries

Figure 5.3 Key Elements of a Project (Illustration from MI and EV case studies)

Context	<ul style="list-style-type: none"> • EB - Congestion; Pollution; Private vehicle ownership; Performance of BMTC bus fleet • MI - Karnataka's aridity, groundwater situation; cropping pattern, inefficiency in fertilizer, energy and water use; low agricultural productivity; electricity subsidies
Interventions	<ul style="list-style-type: none"> • EV - How many buses, which routes, what business models; what safeguards (and why?) • MI - Which regions and crops; what business models; what safeguards (and why?)
Objectives and Targets	<ul style="list-style-type: none"> • EV- Demonstrate how EBs can make mobility environment friendly and generate self sustaining impetus for wider adoption of EVs along the lines of national policy mandates • MI - To enhance agriculture productivity, reduce pressure on environment and natural resources such as water, and secure livelihoods for vulnerable farming communities
Actors and Relationships	<ul style="list-style-type: none"> • EV - BMTC, GoK, Gol, EV manufacturers, financier, citizens using public transport • MI - GoK, Gol, manufacturers, implementer (if other than GoK), farmers
Activities and Outputs	Phase wise plan for activities planned and the concrete outputs expected
Expected Outcomes	Expected green growth benefits from the activities and outputs
Project Costs and Financing	Details of upfront and recurring costs, viability gap, expected return on project, revenue stream and sources of finance

and disbursed by the Ministry of Finance under the Faster Adoption and Manufacturing of Electric Vehicles (FAME) scheme. This will involve limited transactions and a single beneficiary. But in the MI project, capital subsidies on MI set-up for individual cultivators in the target region have to be given, which will involve multiple beneficiaries and complex calculations to arrive at the subsidy requirement for the project. Concerns of water requirements for the specific crop/s grown, socio-economic status of farmers, availability shortfall, etc. could figure in calculating the total subsidy and choice of business models. Thus, the institutional set-up to disburse subsidies and monitor final results becomes very important. Finally, in both MI and EB cases, soft loans and low-cost financing also play an important role as there are limits to lump-sum grants.

The expected returns on investment from financing parties must cater to the diversity of their objectives. Government or philanthropic institutions are not as interested in financial returns as they are in the green growth benefits accrued - enhanced resilience of vulnerable populations, better liveability in cities, efficient utilisation of capital, creation of robust infrastructure, etc. On the other hand, creditors and investors aim at generating wealth by investing in a project, or at the least, recover their initial capital with agreed interest. Based on the revenue generating propensity of the project, the choice of investment mediums and business models becomes very important.

Conclusion

The objective of this guide is to acquaint Karnataka Government functionaries with key concepts pertaining to green growth, recent efforts from scientific and research community to develop a green growth roadmap for Karnataka, principles and practices for providing green growth focus to developmental projects, considerations for choosing the right projects, and modes of implementation and execution strategies such as project design documents or policy implementation roadmaps. While Karnataka faces some unique challenges and opportunities, much of the impetus generated here will provide a blueprint for other states in terms of planning and executing green growth programmes. It is therefore necessary that those responsible for leading these programmes and projects are well-acquainted with the essential concepts and methods.

This guide also attempts to bridge the gap between theory and practice of green growth. While various multilateral development organisations have come out with handbooks and guides for green growth and regional green growth roadmaps also exist internationally, the unique focus of this publication has been on translating theory to practice and principles to processes. Emphasis has been provided on concrete and relatable illustrations to allow 'green growth thinking' to emerge organically. We hope this guide will be used widely by policy makers and executors alike, and foster creative thinking towards solving the most complex challenges in public policy.

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