



Financial Gradients: Methods and perspectives for financial policy in sustainable development action

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ABSTRACT

DESCRIPTION

Access to good financing is one of the most important requirements to start a project, programme, company, or activity. In the field of sustainable development or climate change, it is no different. Therefore, having a proper financial policy in the field of sustainable development is important. Moreover sustainable development activity is complex and the sources of finance are diverse with an ever increasing need for investment grade finance. It is in this context that this case espouses the idea of understanding financial interactions. While financial interactions can be thought of in various ways, this case will investigate them through the creation of financial indicators. These financial indicators called 'financial gradients' may thus help policy makers to understand the financial interactions and help design policy, especially financial policy, in a way which is most suited for sustainable development.

Learning objectives:

To understand the interactions of finance and sustainable development action.

To understand requirements of financial policy for creation of robust financial gradients.

Subjects covered:

Financial interactions; Financial gradients; Financial policy

Setting:

- Lighting a Billion Lives (LaBL) programme, India

DISCLAIMER

All details in terms of data analysis and figures given here are only for educational purposes. The author does not have any responsibility whatsoever in regards to the accuracy and/or comprehensiveness of the data provided. The learning case has been developed with the help of the data available from TERI's Lighting a Billion Lives initiative. For further details on the LaBL initiative, refer to the web site <http://labl.teriin.org>.



INTRODUCTION

It can be said that the interaction of finance, especially with regard to sustainable development action, is not an easy subject. There are various complexities, and sadly there is no easy language to understand it. However, finance and its interactions are so important that policy makers can not neglect it. This case study takes a step in the direction towards explaining the complexities of the interactions of finance and sustainable development action. Given the present economic governance architecture, only those activities which are financially sustainable, are sustainable in the long-term. This case study explores TERI's Lighting a Billion Lives (LaBL) initiative and how it makes sustainable development action long term and financially sustainable.

Financial indicators are widely used in corporate finance and financial accounting to keep transaction costs at efficient levels, allowing corporations to mobilise finance from across the globe. Investors can keep track of their investments through relevant financial indicators and thus, do not have to make actual physical checks very often. Transaction costs for sustainable development projects are indeed very high. Perhaps in the absence of financial indicators, the United Nations Framework Convention on Climate Change (UNFCCC) mandated once a quarter real audits of LaBL equivalent projects under their Clean Development Mechanism (CDM). Such transactions are extremely expensive and inefficient.

This case study is divided into five sections. The first part explores Lighting a Billion Lives initiative by TERI. The second part reviews the genesis of financial gradients. In the third part, there is section on how this methodology can be applied in the field of sustainable development. Finally, In the fourth part, the core of the case study is reached with the analysis of the financial inflows. Finally, challenges that lie ahead are discussed.

ENERGY ACCESS USING RENEWABLE ENERGY

While renewables have significant potential in contributing to decrease in fossil fuel use and thus make a significant difference to energy security goals, they also lead to a reduction in environmental impacts (Palit & Chaurey, 2011). In addition, they significantly improve livelihoods in rural areas where energy access has been a major hindrance in achieving development goals. Conventionally, the role of renewables has been considered primarily for decentralized applications. The potential of solar thermal energy is very large, varying from megawatt level solar thermal power plants to domestic appliances such as solar cookers, solar water heaters and PV lanterns.

The Lighting a Billion Lives (LaBL) campaign is an initiative by TERI. LaBL strives for better illumination and smoke free environment indoors. It also provides opportunities for livelihoods both at the individual and at village level.



LaBL operates on fee-for-service or rental model wherein centralized solar charging stations (SCS) are operated in villages for charging lanterns, which are provided daily by rent to households and enterprises. A typical solar lantern charging station consists of 50 solar lanterns with five solar panels and junction boxes. The charging stations are operated and managed by entrepreneurs belonging to the local community (self-help groups/individual youths) who qualify for the selection criteria, which is set as part of the LaBL campaign. These entrepreneurs are selected and provided handheld support by local LaBL implementation partners, each of whom is called a LaBL partner organization (LaBL-PO). The rent is collected by the entrepreneur, a portion of which is used for operation and management O&M of the charging station and for replacement of the battery, which may be required after 18-24 months of operation.

Many communities residing in rural areas, particularly in remote areas, indicate a visible need for electricity, but this may not necessarily mean the ability to pay for the service. Many times, the residents in these areas have low levels and irregular streams of income. In this context, the scarcity of electricity may seem like an exciting market opportunity for an investor or entrepreneur, however, the lack of capability to pay on demand in the open market, combined with the need for plants to maintain a certain load factor so as to not operate at a loss, underscores the need for careful demand estimation while selecting target villages. The rental model has been successful as it conducts a scoping survey to estimate the likely demand for lighting and ability to pay and sizes the plant/operation accordingly.

Financing is a key challenge of a solar PV programme. The financial model under the LaBL initiative attempts to bring together all stakeholders on one platform. The government, TERI, local NGOs, LaBL-POs, and the community are all involved, in concert with the public-private-people partnership model. The capital costs for setting up the SCS in remote locations are mainly grant-supported from the LaBL Fund (raised from corporate and government schemes) and co-financed by the LaBL-POs. For 'not so remote' villages, where the villagers have some paying capacity, the operators are provided with the option to set up SCS as their own enterprise either putting in their equity or availing loans (facilitated under LaBL initiative), with part of the SCS cost being subsidised by the LaBL Fund.

THE GENESIS OF FINANCIAL GRADIENTS

While analyzing financial data for Lighting a Billion Lives (LaBL), there was a need to structure the sources of finance. It was noticed that while sources of finance for the corporate sector were well researched and theorized, and is now an established subject called corporate finance, the same could not be said for the sustainable development sector. It was also noticed that not only were the nature of projects different, the sources of finance were also different varieties: some sources of finance adhered to conventional norms, but other sources were unique to the sustainable development projects. Sustainable development projects were also traditionally thought of as being financed only with public finance or grants and aid; however, over time and certainly in recent times, there has been a need to attract other sources. Additionally, it was felt that the nature of the traditional sources were changing as well. For instance, public finance, which primarily consists of government money with fiscal objectives, was starting to include soft loans.

It was also observed that financing of sustainable development projects start with an emphasis on grants; however, if a project has to sustain over long periods of time, then the project should be financially sustainable as well. Grants are particularly volatile sources of funding, especially in recent times. The availability of public finance as a pure expenditure source is also becoming increasingly scarce since governments want to cut down on public expenditure. Whether a project should be profitable or not is another point, but for the project to continue, there should be enough financial inflows to carry on with the project. This way, sustainable development projects will last over a long time – at least for 25 years or longer. They will have time spans which commensurate with major infrastructure projects. However, if the financial backing is being availed only through grants, then it will be difficult to move beyond a three-year time horizon, and the project will die an untimely death. In order to avert such a situation, project managers will have to adjust their financial sourcing mechanism, by looking for a more diffused financial mechanism, where the share of non-grant or non-public finance sources increases over time. If the finance aspect of a project is viewed as a series of yearly bar graphs where the amount of money is on the y-axis and sources on the x-axis, then in the initial years, the slope or gradient will be steep as financing transitions from grant to equity in the project. However, the slope will become more gradual after a few years of the project being in existence. This indicates that the project is working well and is attracting investments on its own merits. Financial gradients can be indicative of the long term viability, sustainability, and acceptability of the project.

Discussion Questions

Question 1:

How can financial gradients be indicative of the long term viability, sustainability, and acceptability of the project? Should the grant component completely disappear from the project after a few years as an indication of financial sustainability of the project?

FINANCIAL GRADIENTS: A METHOD FOR FINANCING SUSTAINABLE DEVELOPMENT ACTION

Developing a financial theory on programmes or projects in the domain of sustainable development is a daunting task. Nonetheless, an attempt is made in that direction following the experiences with similar sustainable development projects. The recent financial crisis of 2008 has challenged conventional positions in finance. A pertinent conventional view point is elucidated in the Modigliani-Miller proposition (Modigliani & Miller, 1958). It is present in all corporate finance text books, and is considered seminal work in capital structure of the modern corporate. It has served its purpose especially in the corporate sector; however, in the wake of the 2008 financial crisis, this proposition has to be understood in a new light. Many papers allude to this topic with various entry points; for instance, one may look at it from an entrepreneurial angle or from the more holistic viewpoint of mortgages (Ostaszewski 2009). The outcome of these papers point towards the premise that the nature and sources of finance crucial from the institutional and governance points of view. The Modigliani-Miller proposition assumes symmetric information and efficient markets. However, given the



present scenario, the previous assumptions (as originally inferred), may not be valid. Hence, an inference can be drawn that the nature and sources of finance play a crucial role in the process of value creation, both at the firm level and more importantly at the institutional level.

Another facet of this case is sustainable development. Sustainable development has evolved over the years, after much deliberation, to include the three most crucial aspects of human welfare – economic, social, and environmental – and all common areas between them. Sustainable development has induced a change in thought from a singular focus on economic growth to a more multi-faceted approach. Since the formulation of Agenda 21 in 1992, adopting a development path on the principles of sustainable development has become the goal for huge majority of countries around the world (Kumar 2011).

Given the new challenges of the financial world and the emergence of the concept of sustainable development, projects and programmes in the domain of sustainable development have to be structured and thought about from a fresh perspective.

The method of financial gradients is understanding the nature and sources of finance. Inherently, a financial commitment is made for a particular purpose; also, the mix of finance in a particular project can guide the results or outcomes, particularly at the institutional level. A seemingly innocuous debt-equity ratio, if not interpreted correctly, can cause a global financial crisis. When considering the financial aspects or interactions, the nature and sources of finance are the most important; the change of capital structure over time, the nature of the business model, and other financial aspects can be considered, but, the essence of financial gradients lies in the understanding of the interaction between the nature and sources of finance.

The study given below on financial inflows for LaBL shows that financing sources like grants, which have low monitoring requirements, are actually very expensive, since the project implementer will have to figure out monitoring mechanisms and pay for them. However, in the case of equity, which has the highest monitoring requirements, as a source of finance, it is much less expensive, as the equity investor will monitor the project based on his or her own self-interest; so, the costs of the project implementer for monitoring requirements are virtually reduced to zero.

FINANCIAL GRADIENTS AS AN APPROACH TO ANALYSE FINANCIAL FLOWS

Financial gradients can be seen as an approach to analyze financial flows; it can develop indicators to assess the health of the project. The health of the project is good if the key challenges are met while the project is running.

The Financial Inflows for LaBL Project

The key financial challenge to implement projects related to sustainable development is to secure long-term, stable financing. This challenge can be broken down into two parts (particularly for non-governmental implementation of projects). First, how does the project diversify the sources of funds; and, second, how does the project scale up funds from all the sources.

Given these challenges, it can be said that a programme or project in the sustainable development field has attained credibility in terms of its financial and business models, if there are positive trends in two key financial indicators. First, the overall financial inflows have to increase from all sources – this is particularly true when a project has just started and scaling up is an inherent programme-level requirement. Second, over time the sources of finance should be diversified. Therefore, over time, the percentage share from different sources should indicate a more equal distribution.

The periods of analysis for LaBL are from 2008-2009, 2009-2010, and 2010-2011. LaBL funds have been generated through a range of financial instruments, which largely include grants, but also equity investments, loans, syndication, payment for services, research grants, and so on. Apart from the two key challenges, there are a wide variety of questions, which need to be addressed:

- How can the financial flows for the LaBL campaign be analysed and trends interpreted?
- Is there an increase in the volume of financial inflows in the project?
- Is there diversification in terms of the sources of finance?
- Do the trends show progress in financial viability and sustainability of the business model developed by LaBL?
- To what extent is LaBL leveraging private finance?
- What is the nature and quantum of public finance being leveraged by LaBL?

Using the financial gradients methodology, capital inflow for the LaBL project will be analysed. For the purpose of this analysis, two schemes of classification have been created: Sources and Nature. Sources identifies the entity providing the fund, while Nature provides information about the characteristics of the financial inflow, whether it is equity, debt, public finance or grant, and what kind of tax or other kinds of financial implications are attached to them. All inflow transactions were analysed and clubbed together in different categories within the classes. The categories were created such that each one is mutually exclusive of the other (see Table 1 and 2).

Table 1. Sources of LaBL finance

Items	Sources of LaBL finance
1.	Bilaterals
2.	Multilaterals
3.	Events
4.	Registration charges
5.	Co-funding
6.	Government
7.	Corporate social responsibility
8.	Institutional Social Responsibility
9.	Individuals
10.	Payment for services

Table 2. Nature of LaBL finance

Items	Nature of LaBL finance
1.	Pure grant
2.	Research grant
3.	Loans (soft or otherwise)
4.	Equity (including co-funding)
5.	Public expenditure

The categories indicate the evolution of the pattern of financing in LaBL. Table 3 sums up the nature of finance with respect to monitoring requirements. There are two key points with regards to Table 3. First, lower monitoring requirements essentially mean that the cost of monitoring will be much higher. Financing sources like grants which have low monitoring requirements are actually very expensive; as mentioned, the project implementer will have to figure out monitoring mechanisms and pay for them. However, in case of equity (which has the highest monitoring requirements) as a source of finance, it is much less expensive; the equity investor will monitor the project in his or her own self-interest – for the project implementer, the costs for monitoring requirement is virtually reduced to zero. Second, a research grant should be interpreted as equity, as the output of the research grant can potentially be monetized and as a result of that, returns can be earned. Keeping this in mind, both equity and research grants should constitute equity.

Table 3. Nature of finance and monitoring requirements

Category	Definition	Monitoring requirement
Pure grant	Funds given as a part of philanthropic activity or partly with an intention to claim tax exemption	Negligible
Research grant	Funds given with a research objective and a tangible outcome is expected (e.g. a report, a product)	Low
Public expenditure/ Subsidy	Government funds with fiscal objectives.	Medium
Loans	Funds provided by a bank with a terms of reference (ToR) similar to retail lending	High
Equity	User/community/entrepreneur contribution towards the project hardware cost	Highest

Case Study Analysis

The pie charts represented in figures 1-3 help us understand the financial trends observed in the nature of funds received by LaBL for the three financial years being analysed. From the pie charts, it can be inferred that there is a movement from a pure grant-based method of financing to a more community-based or private equity-based method of financing. This equity-driven model will get further impetus when there are more lines of business, such as provisions for charging fmobile telephones in addition to charging solar lanterns, are attached to the core model. There are various possibilities for increasing lines of businesses; however, the charts below for the first three years are for solar lanterns as the only line of business.

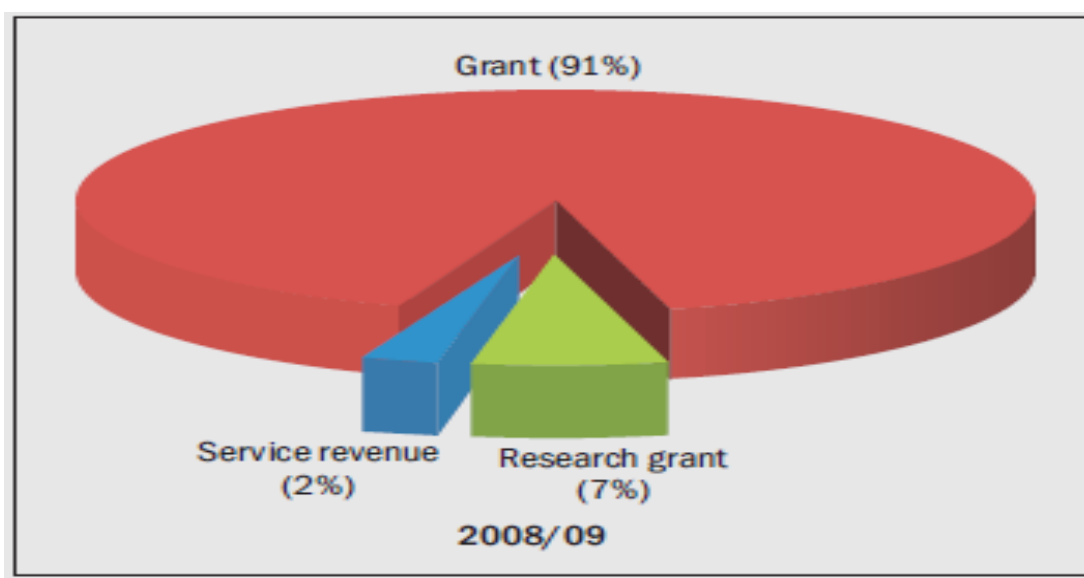


Figure 1. Financial inflows for the year 2008-09

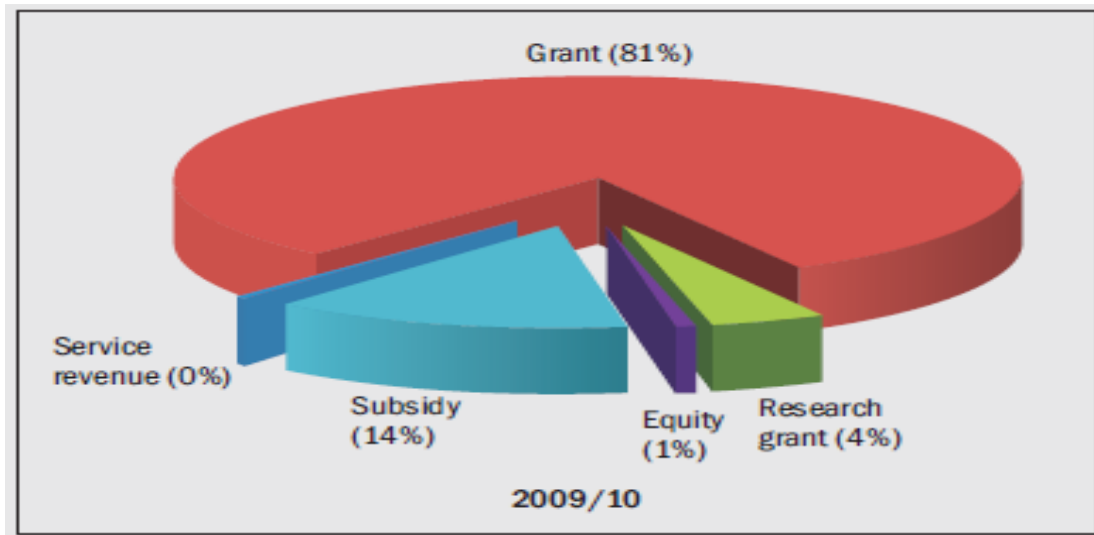


Figure 2. Financial inflows for the year 2009-10

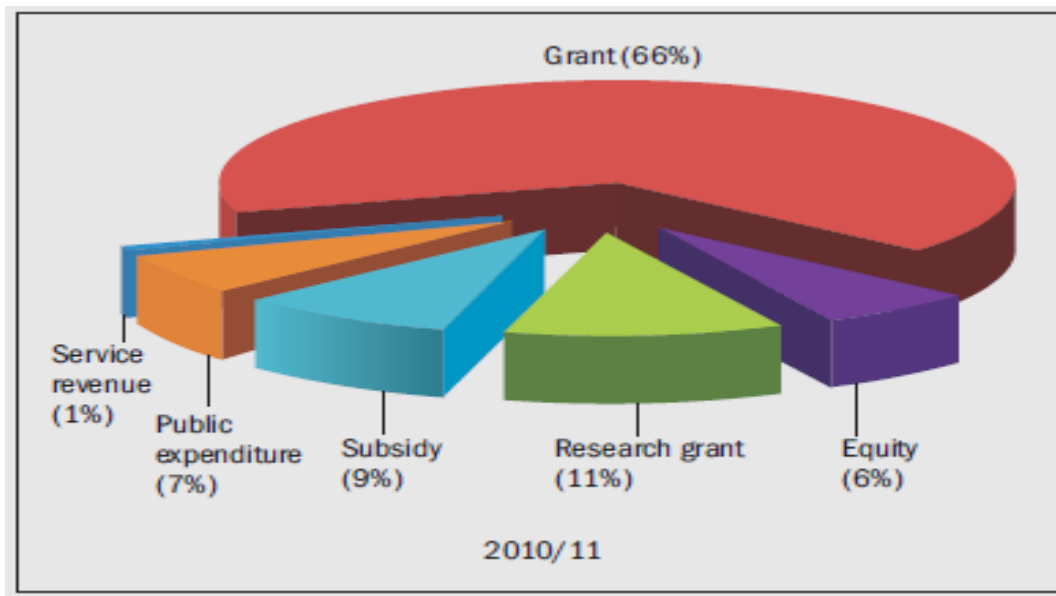


Figure 3. Financial inflows for the year 2010-11

It can be seen from the pie charts that in the first year of LaBL’s operation, there was no equity component. The percentage for this component then rises to 1% in the second year and then, to 7% in the third year. We also see that the pure grant component is decreasing rapidly from an ominous 91% in the first year to 81% in the second, and a far more viable 66% in the third year. If we add the research grant to pure equity, we find that the equity component is doing very well, from 7% in the first year to 16% in the second year, and finally a very promising 27% in the third year. Overall, the non-grant finances are rising fast from 9% to 19% and then to 34% in the final year.

We should remember that this strong performance in building a sustainable financial model was built with only one line of business; the charging stations have the potential to stand

alone as a viable business without any grant component in the future when more lines of businesses are included. We must also note that while we have discussed finances in terms of percentages, we must bear in mind that in absolute numbers (or amount of money being allocated for LaBL), there have been huge increase across all categories.

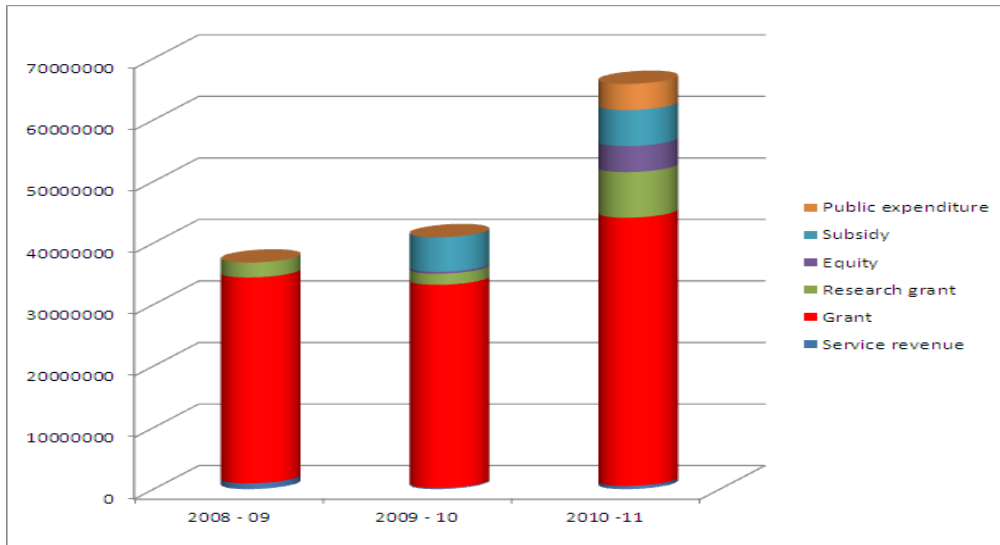


Figure 4. Inflows in Indian Rupees (INR) from 2008-09 to 2010-11

In Figure 4, we can see that there was an overall increase in financial inflows from year to year; we can also see that each individual component shows an increase in magnitude of financial inflows.

The analysis so far outlines two gradients as key – one, an increase in total finance which is an indication of scaling up of efforts as funds are invested towards workable solutions and second, decrease in external finance, particularly grants, as a percentage of total finance.

There is a clear trend that the grant component is decreasing and the equity component, both pure and in other forms, is increasing. We also see that the total funding across all components is increasing as well. This definitely augurs well for the LaBL finance models. There is a clear trend that LaBL finance is moving from a pure grant-driven financial model to a more flexible model where private or investment category financing mechanisms are playing larger roles. We can also see that the two key indicators, one of scaling up financial inflows, and second, of achieving diversification from the point of view of sources of finance was also achieved.

Question 2:

- a. What are the key financial challenges of a sustainable development project? How can these key challenges be addressed?
- b. What is the role of public finance? What percentage/ratio of grant, public finance, debt and equity should there be in a sustainable development project? Should the ratios keep on changing or stabilize over time?



- c. Should sustainable development project attract finance from various sources? How do these various financial sources act as checks and balances vital in such projects?

THE CHALLENGE AHEAD

Financial gradients are a method for understanding financial flows in relation to the nature and sources of these flows. It can give us an indication (via development of financial indicators) of the health of a sustainable development programme. The case study in this paper reflects that it has the methods offers the potential to develop better understanding of the financial mechanism prevalent in the sustainable development field. However, in the field of sustainable development, much more research needs to be done and many more case studies applying the financial gradients method needs to be carried out to make financial gradients a robust concept.

Working session 1:

Analyse and discuss your understanding of the nature and sources of finance and its importance for policy structure. Discuss these key questions below:

- Is attracting investment grade finance an important indicator for sustaining a sustainable development action?
 - If yes, why?
 - If no, is there an alternative?
- Is financial gradients a useful method to figure out indicators? Can financial gradients help in giving policy direction?

Working Session 2:

Consider the key aspects of a financial policy as a framework to support sustainable development action:

- Will financial indicators for sustainable development projects help in monitoring projects and programs?
- Will the financial ratios change over time for a particular program? Will there be different ratios for different types of programs?
- Will a complete investment grade financing source be helpful for sustainable development?
- From a financial policy perspective, can financial gradients help in structuring PPPs (public-private-partnerships)?

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