

Transparency helps in balancing the environment, society and economy: lessons from the world's largest public works program

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ABSTRACT

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Sustainable development depends on the complex set of interactions between the natural environment, the society we live and economic conditions. The relationship between humans and the environment is like 'one will give and other will take', during which equilibrium may get distracted. Economics leverages the growth potential of the society and society is influenced by the natural environment. To maintain the equilibrium between these three pillars of sustainable development there is a need to link them. Transparency during the execution of large-scale projects plays a pivotal role in achieving sustainable development and enables the balance between the environment, society, and economy. In recent times, the governments of many countries have adopted programs for improving the living standards, food security and improved nutrition, health, clean water and sanitation, education, and other aspects of sustainable development goals. This article reports the transparency methods that are implemented for MGNREGA project and articulates the role of transparency in linking between the three dimensions of sustainable development: environment, society, and economics. The paper emphasizes that the mechanism of transparency should reside in all sides of the triangle of sustainability.

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I. Introduction

With the experience gained from Millennium Development Goals (MDGs), the transition to the United Nations (UN) Sustainable Development Goals (SDGs) framework in 2015 reflects a much-needed move into a more comprehensive, multidimensional approach to development (World Bank Group 2016). Brundtland commission report of 1987 namely 'Our Common Future' defines sustainable development as "meeting the needs of the present without compromising the ability of future generation to meet their own needs" (Brundtland et al. 1987). Sustainable development ensures a balance between the three dimensions viz., environment, society, and economy (Tracey and Anne, 2008; Griggs et al. 2013).

One of the primary elements of SDG is to end poverty in all its forms everywhere. It calls for ensuring social protection, enhancing access to basic services, and building resilience against the impacts of natural disasters which can cause severe damage to people's resources and livelihoods (Sustainable Development 2015). The Government of India has many progressive schemes, including the world's largest employment guarantee scheme, the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA), the national social assistance programme, and school-feeding program.

MGNREGA is regarded as an effective social safety net intervention that has successfully integrated the overall social protection and labour systems in the country (World Bank 2018). The implementation of MGNREGA covers entire extent of full country with actual thrust on rural areas. Besides providing employment for the rural sector, MGNREGA ensures overall sustainability in terms of natural resources and wellness society (Bhat and Yadav, 2015). Due to the scale of projects like MGNREGA, there is a requirement of social reporting for exhibiting transparency in the process. Social reporting can be an important practice for any governance regulation to achieve stakeholder accountability (Hess 2007). Transparent Governance through social reports is the key to meaningful stakeholder engagement.

Transparency means disseminating information and sharing it in an open manner. Furthermore, transparency allows the stakeholders to collect information that may be critical to defending their interests (Florini 2007). Transparent systems have flawless procedures for public decision-making and enable the communication between stakeholders and policymakers, and make a wide range of information available. Bertot et al. (2010) mentioned that "In recent years, many governments have worked to increase openness and transparency in their actions. Information and communication technologies (ICTs) are seen by many as a cost-effective and convenient means to promote openness and transparency and to reduce corruption". Matiyabu et al. (2017) reported that ICT-led approach could enhance transparency in the public service.

This paper relies on the successful implementation of Information and Communication Technology (ICT) based methods of transparency for disclosing the data to the various stakeholders in the process of MGNREGA. The essence of this article deals with the topic of how transparency helps in linking the environment, society, and economy. Better management of a country's natural resources can ensure environmental stability. Public works like MGNREGA that are based on water conservation/harvesting and land development activities need to consider the existing state of natural resources before actual implementation, and at the same time should report the changes that are done to the environment. This sort of open government approaches to natural resources can help to preserve the environment (Richardson and Razaque, 2006; Epremian et al. 2016).

The motivation of the study is to address the need for link-ability of the three pillars of sustainable development. UN-DESA (2013) reported that "Over the past years, the global challenges to sustainable development have been driven by a broad set of megatrends, such as changing demographic profiles, changing economic and social dynamics, advancements in technology and trends towards environmental deterioration. A better understanding of the linkages among these trends and the associated changes in economic, social and environmental conditions is needed". Tracey and Anne (2008) mentioned that "realization of economic growth alone is not enough as the economic, social and environmental aspects of any action are interconnected. Considering only one of these at a time leads to errors in judgment and unsustainable outcomes – may result in social or environmental damages in the long run".

MGNREGA as an act, aims at enhancing livelihood security of households in rural areas in India by providing at least one hundred days (and certain times one hundred fifty days to the marginal and vulnerable sections) of guaranteed wage employment in a financial year to every household, whose adult members volunteer to do unskilled manual work. The main intention of these manual works is to create sustainable assets in the areas of land improvement, water conservation, water harvestings and other works resulting in infrastructure development that promote the economic development in rural areas. The number of assets created under MGNREGA in entire country is massive and is estimated to be about 40 million since the inception of the program (NREGA Portal 2018). MGNREGA attempts to unlock the potential of the rural poor to contribute to the reconstruction of their environment to the fullest. To achieve this, it has laid emphasis on creation of productive assets in villages. During the process of

MGNREGA, there are numerous positive impacts on environment rejuvenation, societal upliftment and economic development. **Figure 01** represents the benefits of community works under MGNREGA to environment, society and economy.

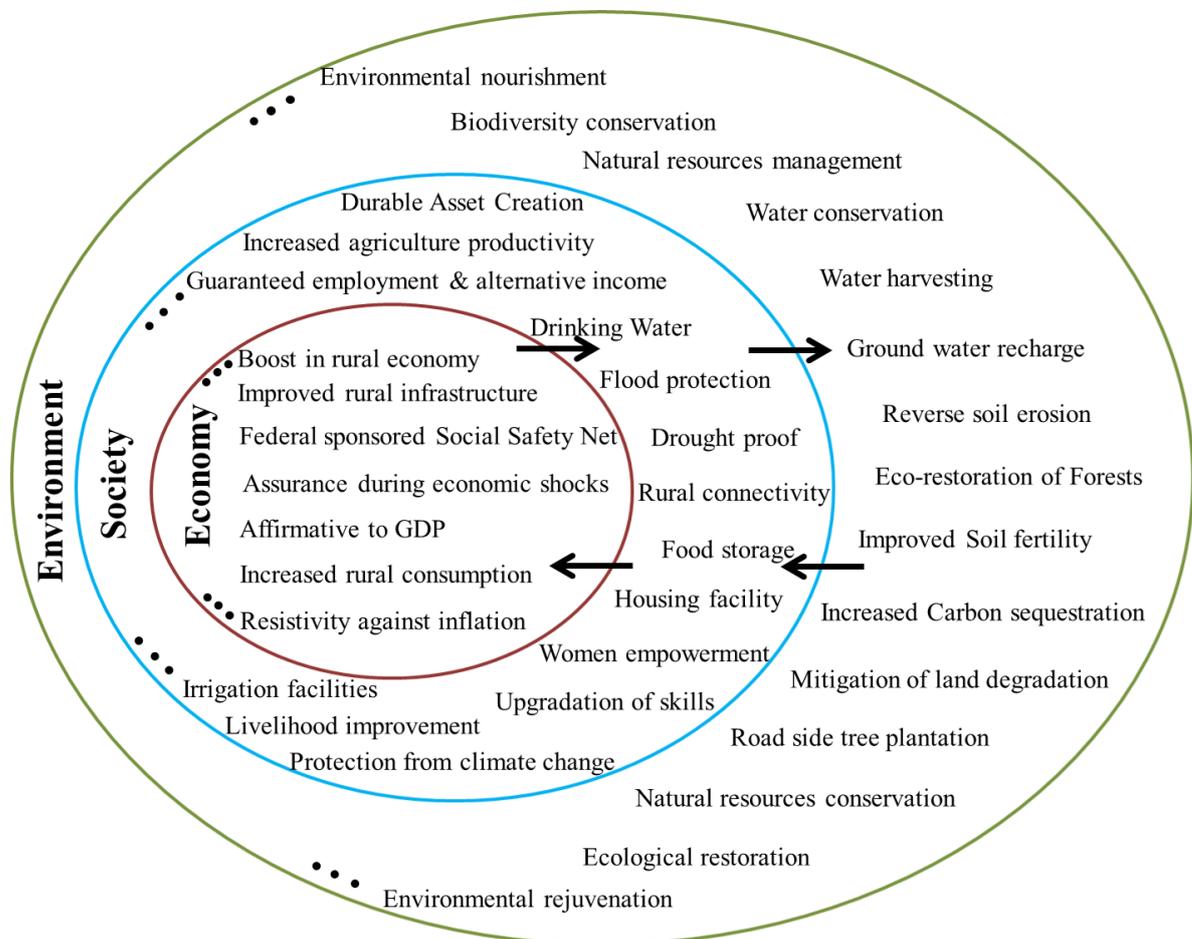


Figure 01. Benefits of community works under Mahatma Gandhi rural employment guarantee act on environment, society and economy.

MGNREGA's impact on environment

Environmental rejuvenation happens during the development of MGNREGA assets creation and in return generates a number of spin-off benefits to the environment in a sustainable way. The programme largely contributes to Natural Resource Management (NRM) by mandating 60 per cent of its total expenditure every year on water harvesting and conservation, a forestation, plantation, land and soil development, and other NRM related works. Study conducted by [Tiwari et al. \(2011\)](#) concluded that due to the activities of MGNREGA resulted in reduction of vulnerabilities of agricultural production, water resources and livelihoods to uncertain rainfall, water scarcity and poor soil fertility conditions. [Esteaves et al. \(2013\)](#) have done extensive studies to find the impact of MGNREGA on environment and reported that MGNREGA program is generating multiple environmental benefits leading to improved water availability and soil fertility resulting in increased crop production.

MGNREGA's impact on society

MGNREGA is designed to provide regular and predictable support to poor and vulnerable sections of the society. A distinctive feature of MGNREGA is that of non-contributory character that is beneficiaries do not have to pay or contribute financially to receive the benefits, yet they will get wages for their work and as a spin-off the society will be benefited with durable assets. MGNREGA supports to stand with equal rights to the rural women to participate and to gain sustainable livelihood. The act has a great impact on liberty and decision making power of poor women. It provides women security and protects them from exploitation. They can work with their male partners and they can also look after their children during

the working hours. This act gave an opportunity to the women to become less dependent on male and get equal wages with respect to the men. Finding of [Esteves et al. \(2013\)](#) confirms that MGNREGA program is contributing to reduce vulnerabilities due to risks of climate abnormalities.

MGNREGA's impact on economy

MGNREGA is a poverty alleviation strategy for rural areas as prevalence of poverty is high in rural areas of India. The scheme has proved to be a major boost in Indian rural population's income. GoI has strengthened the focus on poverty by revamping income for the poorest of the poor through MGNREGA. With over 75 million beneficiary households, and expenditures between 0.5 and 1% of Gross Domestic Product (GDP), MGNREGA is amongst the largest anti-poverty programmes in the world. MGNREGA enabled the poor to participate in the overall economic activities indirectly and this in turn not only improved the economic growth but all along development in the aspect of quality of life and participation in decision-making. [Esteaves et al. \(2013\)](#) reported that due to MGNREGA activities there is increased area under plantation and orchards potentially contributing to alternative incomes. Many soil and water conservation programmes, land development works and improving eroded lands has transformed the village economies.

II. Materials and Methods

In this study, all the publicly available management information systems (MIS), web-portals, progress reporting mechanisms, mobile Apps and Geoportals (Web portals with the capability of showing geographical maps) which are implemented by the project execution ministry (Ministry of Rural Development) from the year 2016 till data have been investigated for the purpose of validating the transparency of the act. Effective social reporting methods have been implemented in MGNREGA using web portals, mobile Apps, electronic reports, geographically enabled information systems, and publications ([MGNREGA Dashboard 2019](#); [MGREGA Library 2019](#); [MGNREGA Reports 2019](#)). **Figure 02** represents these mechanisms to exhibit the transparency.

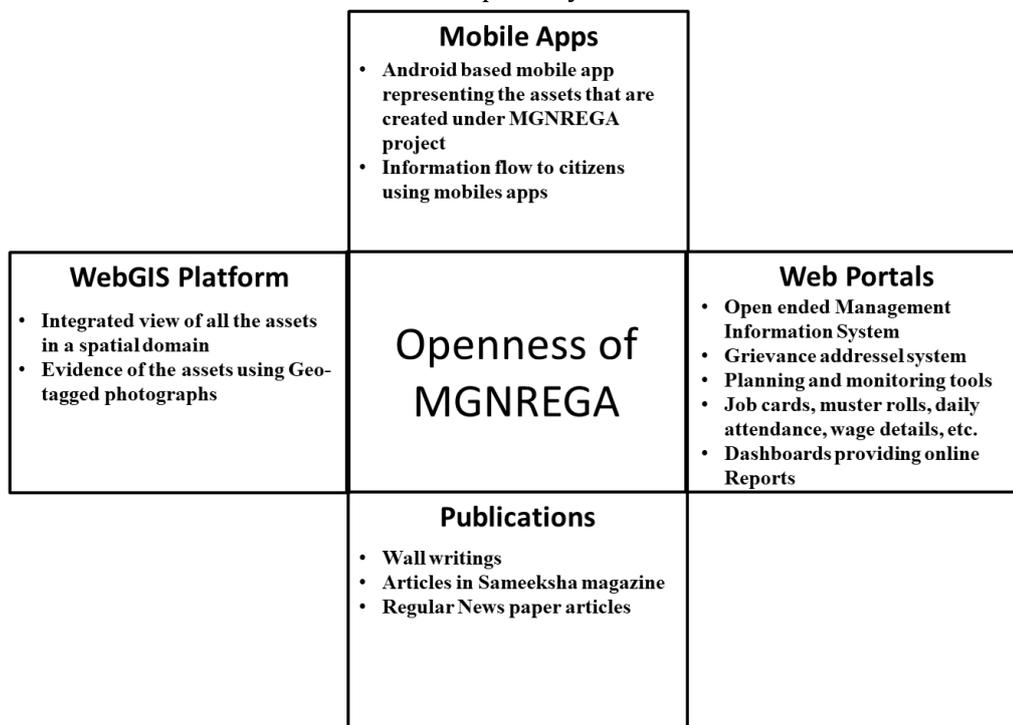


Figure 02. ICT enabled transparency mechanism in Mahatma Gandhi Rural Employment Guarantee Act.

MGNREGA gives citizens the right to conduct social audit of all the works, processes and expenditures. At the ground level these are available as wall writing sat various rural office premises. The facilitation of the social audit through audit bodies is available as a part of right to information and transparency practice. As per the 'public service delivery act' MGNREGA is possessed with solid grievance redressed system.

A web enabled MIS, NREGASoft at server side has been deployed to address the planning and monitoring needs of the MGNREGA scheme. NREGASoft is a workflow based transaction level software designed for mitigating the activities of all the stakeholders of the project and is local language enabled. The results of the software will published in MGNREGA portal (<http://nrega.nic.in>) and disseminates the details regarding implementation of the scheme. The portal is accessible to public for information related to job cards and muster rolls giving details of daily attendance of workers working on MGNREGA work site along with the amount paid to them (eFMS 2016). The portal is accessible by all stakeholders providing them a browser based interface for all MGNREGA related activities. NREGASoft has made a good progress in ensuring transparency by making the various registers, muster rolls, documents, maintains accounts and generates required registers.

In recent years many countries developed virtual (digital) globes as a part of disseminating national spatial infrastructure data, for example, India has developed Bhuvan Geo-portal which is available at <http://bhuvan.nrsc.gov.in> (Yu and Gong, 2012; ISRO Bhuvan 2019). Most of the government agencies utilize this platform for sharing geographic data and host their applications. Geo-tagging photographs can be attached to the web-GIS application to give photographic evidence of the assets that were created in MGNREGA project. In collaboration with the National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO) and National Informatics Centre (NIC), assets in the order of millions of the of the total works created under MGNREGA have been geo-tagged for better monitoring, transparency and accountability (Bhattacharjee 2017). The module is titled GeoMGNREGA. GeoMGNREGA provides integrated view of all the assets for entire Indian sub-continent along with the geo-tagged photos. Figure 03 and Figure 04 shows the screenshots of GeoMGNREGA portal available on Bhuvan platform (in citizen view).

Mobile phone acts as a mode of communication with people at farther places, with greater ease and lesser time. Janmanrega is a mobile app for information flow 'to and from' ground-level, which will connect citizens with the system. As a part of initiative towards good governance, Janmanrega helps to improve quality of public services. This android-based application allows displaying information about geo-tagged assets and is available from Google play store.

MGNREGA has established itself as a benchmark in terms of transparency and accountability and shows how social accountability principles can be applied in monitoring social programmes.

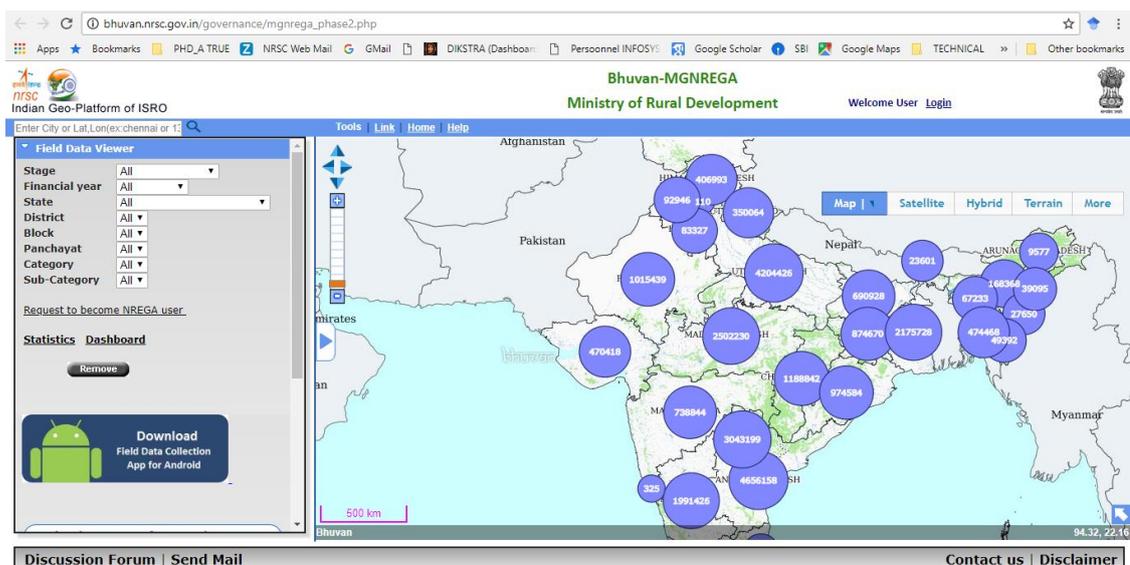


Figure 03. Screenshot of GeoMGNREGA Portal on Bhuvan Platform (in citizen view).

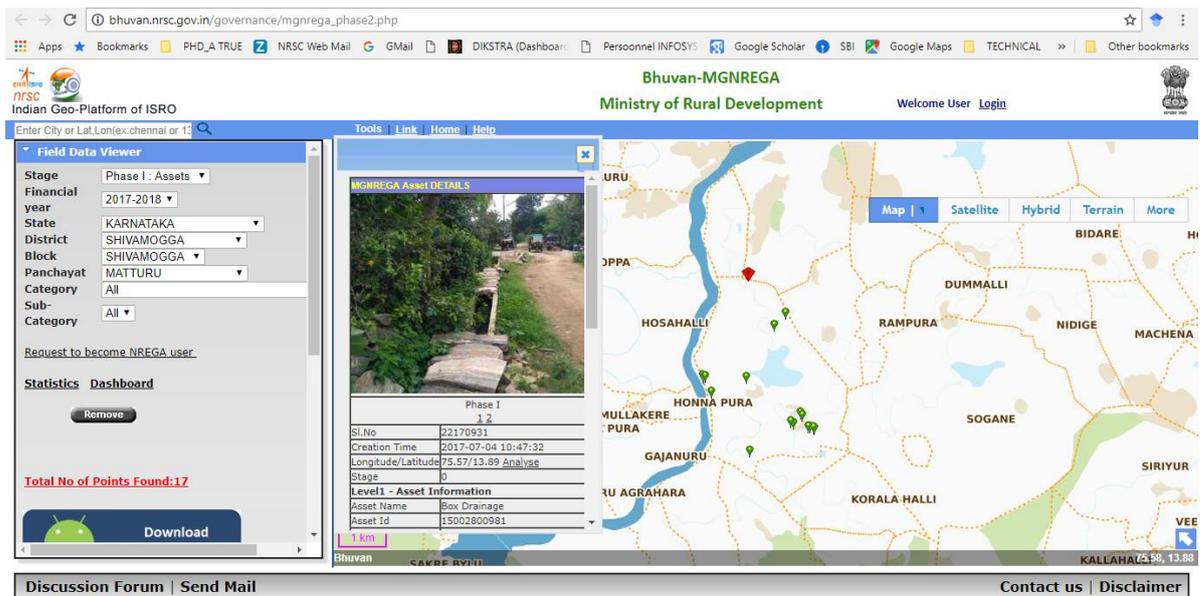


Figure 04. GeoMGNREGA portal showing information about asset in spatial domain (in citizen view).

III. Results and Discussion

Sharma et al. (2016) published the results from 'computable general equilibrium' model of the Indian economy and concluded that "MGNREGA has influenced for improved GDP and household income, particularly amongst poor households, and reallocation of MGNREGA funds to others sectors would result in decreased GDP as well as poor households". The uniqueness of MGNREGA is that during the process of creating durable assets 'by the community' and 'for the community' there is empirical evidence of sustainable development at all the three dimensions i.e., at environment, society and economy.

Economics, for example, has conventionally emphasized three critical factors of production for economic development; they are land, labour and capital (Folke et al. 2016). Land is a native part of environment, labor is governed by society. Hence economy is a subsystem of society and in turn environment acts as a life supporting system for society. (Rajović and Bulatović, 2013) mentioned that the use of natural resources and their economic valorization should follow an action plan and implemented in controlled settings. The activities under MGNREGA are inherited by its inbuilt mechanism of decentralized planning and controlled at various administration levels. Figure 05 shows transparency guided interaction between economy, society, environment which is inspired from the explanations of (Pezzey, 1989) and (Toman, 2003).

The main motive of federal government's investment in MGNREGA is to create value from money as well as human resources and achieve sustainable development at all three dimensions i.e., economy, society and environment. Human capital can be treated as a resourceful stock and affects income levels and economic growth (Goldin 2001). The investments made by federal government in MGNREGA wage employment program do have production in the form of employment, agriculture productivity, household production of goods for own final uses including crops, sustained natural resources, increased consumption, community occupied dwelling services and accumulation of durable assets. ICT enabled transparency methods informs the details about budget allocation, spending, wage details, person days accumulated and various other economy level information through web enabled information system.

In MGNREGA, the society supplies the associated labour services as a rights-based approach and it offers marginalized citizens meaningful access for prosperity through augmenting employment. Sharma (2010) reported that because of MGNREGA there are advantages at society level in the form of enhanced income, effective targeting of disadvantaged groups (women, vulnerable groups and marginal groups), women augment family income, increase in agriculture productivity and rural roads to connect remote villages. All the works under MGNREGA are socially acceptable and dignified and there is no discrimination and marginalisation based on caste and community. Bhosale and Bhole (2018) in their

report mentioned that an asset created under MGNREGA ensures durability. Transparency system in MGNREGA gives information about the assets through online MIS available at www.nrega.nic.in. Bhuvan based GeoMGNREGA gives geo-tagged photo(s) and geographical location information. Transparency in location (geographical latitudes and longitudes) helps in performing location analytics using geographical information system's functions. The advantage of adding location to the social audit helps in citizens understanding of their assets and aids in planning and monitoring of development works. Governments throughout the world use location analytics to make improved decisions with the added advantage of "Where". A location advantage also equips government services to take minimal time to deliver the services.

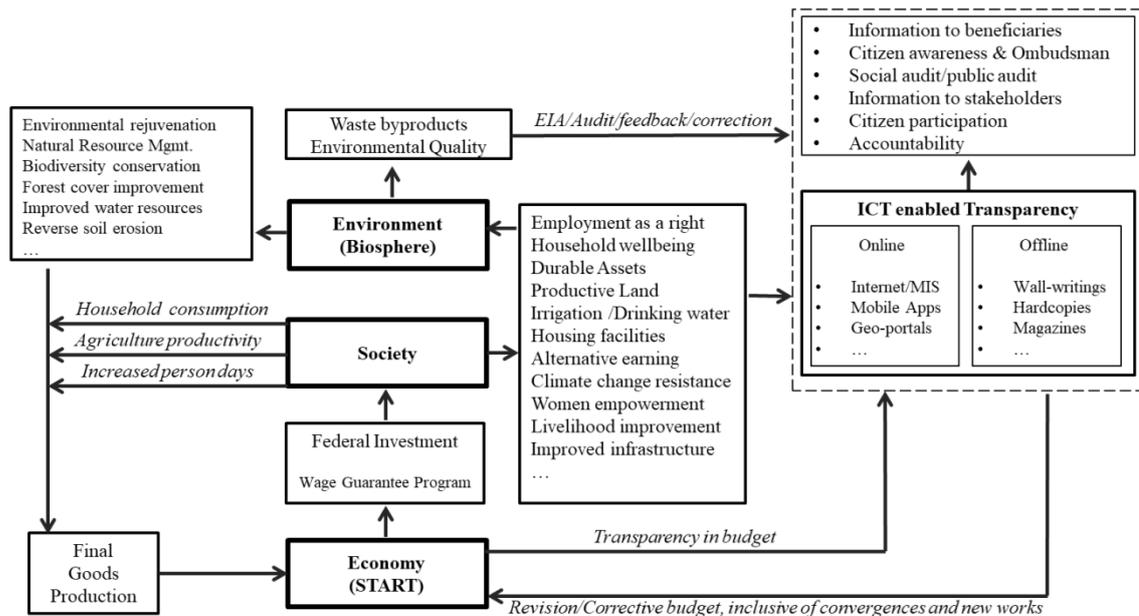


Figure 05. Transparency guided interaction between economy, society and environment.

In MGNREGA, the entire unskilled services are bound to be done on environment and these services are expected to deliver sustainable development in the areas of natural resources management, agriculture practices, biodiversity conservation, and to regulate dynamics of water resources. Details about all the works that are done on this aspect are made available in the transparency process of MGNREGA.

The transparency methods will also help in identifying any waste that results as an outcome and accordingly it can be rectified by audit/impact assessments studies. Transparency address gaps in the program and recursively it improves the efficiency of the program implementation.

IV. Conclusion

MGNREGA as a program is intended for rural livelihood developments now almost established itself as effective social safety net in India. Transparency played a pivotal role to enhance the effectiveness, productivity and efficiency of the program. Potential of the programme is highly encouraging as the implementation process can be adapted as per the changing dynamics of rural economies, the socio-economic and demographic characteristics of the rural households. Figure 06 represents the modified form of 'triangle of sustainability' (Munasinghe 2002). Our findings suggest that the role of transparency should occupy all the sides of the triangle so that the interconnected nature of environment, society and economy dimensions yields sustainability.

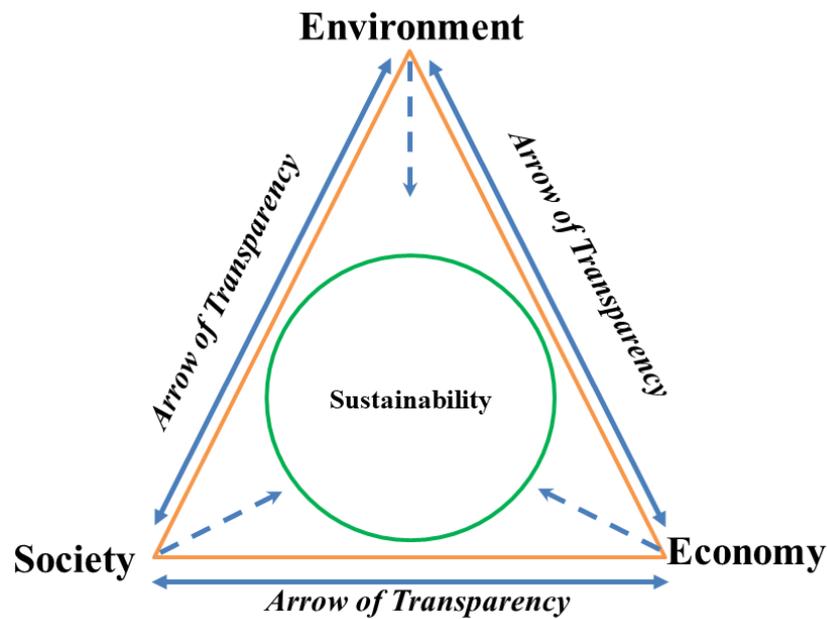


Figure 06. The triangle of sustainability and the role of transparency for achieving sustainability.

Paul (2008) in his theoretical approach suggested that sustainable development requires a balanced and integrated analysis from three main points of view: economic, social and environmental. Each viewpoint represents a specific dimension and has its own distinct driving forces and targets. The environment (and environmentalists) as a system should focus on protection of the integrity and resilience of ecological state. The economic view is geared towards improving human welfare that should increase the consumption of goods and services. The society as a single unit should work in an integrated approach for enrichment of individual and community level aspirations. But for these to achieve transparency is to be attached on all sides of interactions among the three dimensions. Transparency ensures the rightfulness of synergy between these three viewpoints and also enables the corrections for treating the wastes.

Transparency mechanism helps us in informing about system's resilience but the role of economy can act on to improve the resilience so that society is prepared and can react adequately if a crisis occurs. Results from social audits enable to foresee early warning signals and accordingly critical changes in the action plan should be adopted as a norm of practice for programs like MGNREGA as it depends on natural capital. Environmentalists can perform local analysis using the information from mobile apps for getting in-situ details about the MGNREGA activities. The economy viewpoint should amend the policy recommendations from environmentalists and these amendments could help to restore and solve the problems in maintaining biosphere stability.

The proof of MGNREGA's success as an operational mission is its ability to intake objectives of other projects by various ministries and departments under the convergence scheme for time bound execution, but the institutional platform still being at lowest administration level, i.e., village level. MGNREGA keeps the issue of poverty at the centre of sustainability triangle and enables the transparency on all sides of its implementation and enabled the provision for deeper probing of both the social infrastructure issues, natural capital and environmental resources. Adaptive management is inbuilt in the MGNREGA's architecture and hence there is scope for iterative process of optimal decision making under uncertainty. Implementation of MGNREGA scheme has seen major changes in the execution form in the last two-three years by consuming the technical advances of ICT tools and geospatial technology for improving livelihood resource base of people, environment and economy.

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Conflict of Interest

There is no fund for this work. The authors declare that there is no conflict of interests regarding the publication of this article.

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