Physical Targets and Financial Allocation Under Billion Trees Afforestation Project, Khyber Pakhtunkhwa: A Systems' Analysis of Project Allocation for Forest Area Growth

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Abstract

Plant for the Planet drive under UNEP led to the Billion-Tree Plantation campaign across globe. Following the suit, Billion Tree Afforestation Project (BTA) has been launched in Khyber Pakhtunkhwa (KP) province of Pakistan. Politically supported and highly debated project set a target of 2% increase in forest area of KP. The present study is designed to focus on comparing the physical growth target of the project with financial allocation to key activities of the project. The study addresses the question that how much forest area has been enhanced and how much funds have been estimated and utilized to increase forest area under the project. The study also aims at classifying the activities of the project based on area growth, forest area rehabilitation, and activities related to employment generation. The study further explores that how much funds have been allocated to these activities. The data on three Phases of the project have been taken from PC 1 of the project to check the allocation of finances to major activities of the project. Using project data taken from project office, the progress on estimated finances and utilized funds have been checked. A Systems Dynamic model has been designed to estimate and forecast the forest cover of KP during the period 2018-2030. Sensitivity Analysis have been done to check the effect of depreciation of the currency on funds required for a similar project in future. The results show that out of total estimated funds, 38% allocation has been made for *Plantation on Communal and Private Lands followed* by allocation to *Establish Nurseries and Capacity Building of Farmers. Farm Forestry, Promotion of non-timber forest products,* and *Promotion of Forest based cottage industries* are the areas that have been given low priority while allocating financial resources. Out of total estimated costs, about 59.5% has been planned for *Afforestation activities. Of the total estimated costs, just 66.7% funds have been released and utilized.* There is an increase of 6% in area under forest as against the target of 2%. With project growth inclusive, the forest area of KP would be 3.5 million hectares in 2030. There would be 5.7% annual growth in total costs on a similar project in future under homogeneous settings.

Introduction

Growing human population and climate change continue to threaten forest cover. Increased awareness of climatic impacts on economy and ecology led to the realization of enhancing investment on natural resources including forests. Forest investment has great potential for economic development. Investment in forests is a multifunctional subject; from watershed

management to creation of jobs, from forests' timber and non-timber products to livelihood sources for human and animal population. However, there are some issues that need consideration; it is a long-term investment, is an illiquid investment (Sydor *et al*. 2007), and an investment that is not very flexible as it depends on the mother- nature as well. Thus, there are additional criterion for society and environment such as 3Ps-Planet, People, and Profit, or ESG- Environment, Society, and Governance (Stojkovic, 2010).

There is a growing concern to incorporate social and environmental concerns in economic agendas. Corporate Social Responsibility (CSR) recognized by International Standard Organization (ISO) under ISO 26000 is a concept adopted by corporate bodies for ethical investment (European Commission 2004; Stojkovic, 2010). Since 1960s, CSR has attracted the attention of the governments and stakeholders to integrate environmental and social concerns in their businesses thus creating importance for the integration of society, environment and economy. Similarly, the concept "Sustainable forest management (SFM)" has been coined during the Ministerial Conference on the Protection of Forests in Europe in 2009 to emphasize the forest management to achieve social, environmental and economic objectives (ITTO, 2005). Reducing Emission from Deforestation and forest Degradation (REDD/REDD+) is another effort that was introduced under the guise of the United Nations Framework Convention on Climate Change (UNFCCC) in 2005 and was launched in 2008, with the objective to mitigate climate vulnerabilities through forest management in developing countries. This can be delivered by reducing poverty and conservation of bio-diversity. It has implemented more than hundred (100) projects in many countries of the world. The total approved budget is US $ 304,851,546 (UN REDD Program, 2018).

Stojkovic (2010) mentioned two types of forestry finance; Profit oriented finance and Multifunctional finance. The former is dominated by private investors while the latter is mostly

conducted by government and international bodies. The former focuses on timberland investment (Healey *et al*. 2005) while the latter is investment for environmental and social goals. Examples of public investment are; Payments for Environmental Services (PES), investment for Reducing Emissions from Deforestation and forest degradation (REDD and REDD+) etc. There are many issues involved in timberland investment; volatility of market prices, management capacities, land tenure rights, governance, illegal logging, forest fires, pests and land erosions etc. (Scholtens, 2007; Binkley *et al*. 1996:2003:2005). For government funded projects, the issues are mainly political and bureaucratic leading to inconsistent programs especially in developing countries. A study by Stojkovic (2010) found that country related risk, weak management, illegality in finances, lack of collateral, weak planning and skills, effect forest finances. A forestry project report (ADF, 2006) for Mozambique mentioned that the project suffered costs overrun (19%) and time overrun with contractors and consultants' performance unsatisfactory while institutional performance was only just satisfactory. The project implementation was facing problems in terms of recruitment of technical assistance, data collection, financial management and record keeping. During project implementation, there was no Mid-Term Review. Some of the targets at appraisal stage did not have benchmarks to be monitored. The Economic Rate of Return (EIRR) could not be recalculated at the completion of the project due to lack of data. There were no baseline studies prior to the project to measure changes before and after the project.

Worldwide it has been recognized that there are difficulties in data collection, information compilation and analysis on forest funding and investments. The existing surveys and information on the investment in forests in most of the case are outdated. Estimation and analysis of investments in the forest sector is a difficult task as up-to-date information is scarce or even not available (Tomaselli, 2006). Fowler et al. (2011) mentioned that a meager amount is

allocated in the budget by the policy planner ignoring the importance of the forestry sector Lack of investment for the maintenance of the project effects its sustainability.

Forests land use change and forest management issues have been modelled by researchers using number of techniques; CO2FIX V.2 model by Masera et al. (2003) for afforestation projects; HYDE data for estimating land use change by Goldewijk (2001); Osnabruck Biosphere Model (OBM) by Esser and Overdieck (1991); Accounting Model by Houghton et al. (1983); Global Timber Model (GTM), Dynamic Integrated Model of Forestry and Alternative Land Use (DIMA) by Kindermann et al. (2008); Generalized Comprehensive Mitigation Assessment Process Model (GCOMAP) by Sathaye et al. (2006); Data Assimilation (DA) by Williams et al. (2005); Earth System Model- MPI-ESM (Max Planck Institute for Meteorology) by Bathiany et al. (2010) for afforestation; Agent-based Models by Barthel et al. (2008) and Gilbert (2007); Forest, Agroforest, Low-value Lands or Waste model (FALLOW) by Noordwijk (2002) and GIS-based model (Pontius Jr. et al. 2001). All these modeling techniques have their own limitations thus not covering all the systems' components. Further, a particular modeling technique works under certain assumptions. Therefore, it is suggested that new techniques that covers most of the systems' components should be applied. There is a growing concern for integrating modeling methods to get robust results. System Dynamics originally designed by J. Forrester (1961) brings all systems' components and feedback variables into analysis (Gilbert & Troitzsch, 1999; Meadows, 2008). This is a new technique that is being widely used by researchers (see Ansari and Seifi, 2012; Kiani and Pourfakhraei, 2010; Baynes, 2009) etc.

At Global level, the contribution of forestry to Gross Domestic Product (GDP) is about 1% (Contreras- Hermosilla et al. 2007; Agrawal et al. 2013). This figure, on average stands at 0.33% to the GDP of Pakistan during the past two decades. A study by Nazir & Olabisi (2017) mentioned

that if we include illegal wood harvest, the average share of forestry to GDP in the country becomes 0.44% that is even less than the global average of 1%. We are spending very insignificant amount on forestry sector. During 2017-18, out of the total allocation of Economic Affairs, about 41.3% has been allocated to Agriculture, Food, Irrigation, Forestry and Fishing (Government of Pakistan, 2018). Out of the total National Development Program i.e. Rs. 1001000 m., about Rs. 815 million had been set for Climate Change Division during 2017-18, that is 0.08% of the total allocation (GOP. 2017). The government has made an allocation of Rs. 802.69 m. for climate change under the Public-Sector Development Program (PSDP) (Rs.1.03 trillion) for the year 2018-19 (Ahmadani, 2018) that becomes just 0.078%. Thus, on average we are spending less than 1% of the PSDP on climate change including forestry.

The forest area of Pakistan is 4.5 m. ha out of which about 40% is in Khyber Pakhtunkhwa Province (Bukhari et al., 2012; Govt. of Khyber Pakhtunkhwa, 2016). The results of a research by Nazir and Ahmad (2018) show that built-up area, rangeland, and cultivated area have increased over time having highest growth in built-up area (9%), followed by rangeland area (1.7%) and the area under cultivated (0.3%). The study suggested that controlling deforestation would not help to improve forest area, but land use control policy and massive afforestation campaign should be started in the country.

To enhance global forest area (3.99 billion hectares), a billion-tree plantation drive had been initiated by the UNEP in 2006. Many countries are participating, and billions of trees have been planted across globe. Pakistan has also taken an initiative and one of its provinces has prepared a Billion Trees Tsunami Afforestation Project, later called Billion Tree Afforestation (BTA) Project. The project is designed for four (4) years (2014-18) prevailing over three Phases with the third Phase additional period up to 2020 (Govt. of KP., 2015; 2017). The BTA project aims

2% increase in forest area of Khyber Pakhtunkhwa province of Pakistan. Besides, it aims to create employment, to rehabilitate existing forests and watershed areas. India has also launched billion-trees project (UNEP. 2007) with the aim to solve two major problems: youth unemployment and poor air quality. For the task, up to 300,000 youths have been hired to plant about 2 billion trees along the country's highways (Spirit Science, 2015). It aims to increase the overall forest cover of India from 21% to 33 % over the coming years (Davis, 2016).

The first part of the paper incorporates information on billion trees campaign across globe in general and in Pakistan in particular. The second part discusses the objectives and methodology followed by the present study. The third part discloses the validity of the model along with the results of the model. The last part describes the discussion and conclusion of the research with some suggestions for future afforestation projects.

The study finds out that how much area has been enhanced under the project and if we include the growth achieved under the project, how much forest area would be increased by the end of our study period. The study assumes uniform price level during the project period 2014-18 to compare the estimated costs, finances released, and funds utilized. It is hypothesized that other things; geographical, climatic and political variables affecting on the costs of the project would remain the same during the costs estimation for future project; only the currency depreciation due to inflation has been counted to estimate the total finances required for such a project in future.

The main aim of the study is to analyze the physical target of the project and financial allocation made thereto. The objective of the paper is to develop a Systems Dynamic model to estimate the growth of forest area under the project through the following tasks:

- Identifying the main targets of the project and classifying major activities to meet the targets of the project;
- Estimating Phase-wise (I, II, II) financial allocation to key activities of the project;

- Analyzing the progress on forest area growth and financial allocation made for the said activity;
- Analyzing the costs estimated, released and utilized to carry out the activities of the project;
- Making projection for the forest area enhancement till the end of the next decade;
- Estimating per hectare costs to determine the total finances required for a similar future project in future;
- Giving some suggestions to plan a more effective strategy for such a forestry project in future.

Methodology

To answer the questions and to fulfill the objectives, following methodology has been used:

To address the first two objectives i.e. the main targets of the project and financial allocation to main activities, PC-1 of the project has been reviewed. The information on all three phases of the project has been sorted out to estimate the Phase wise activities of the project. To classify the activities based on employment generation, rehabilitation and afforestation, the project officials have been consulted as there are many overlapping activities. This was an important task as to draw a clear picture of the project activities versus main target of the project. To address the next two objectives, the project office was the source of information to get updates on the costs estimated, funds released, and finances utilized to meet the targets. The last two objectives have been met by designing a Systems' Model to address the research questions and to make projection.

To check the past growth in forest area, KP., data have been taken from 1972-2015. Average growth rate in forest area KP. has been taken to make projection till 2030. The formula for growth rate is as follows:

$$Growth\ Rate = (V_{present\ value} - V_{past\ value}) / V_{past\ value}$$

The Systems Model and its equations has been formulated as follows:

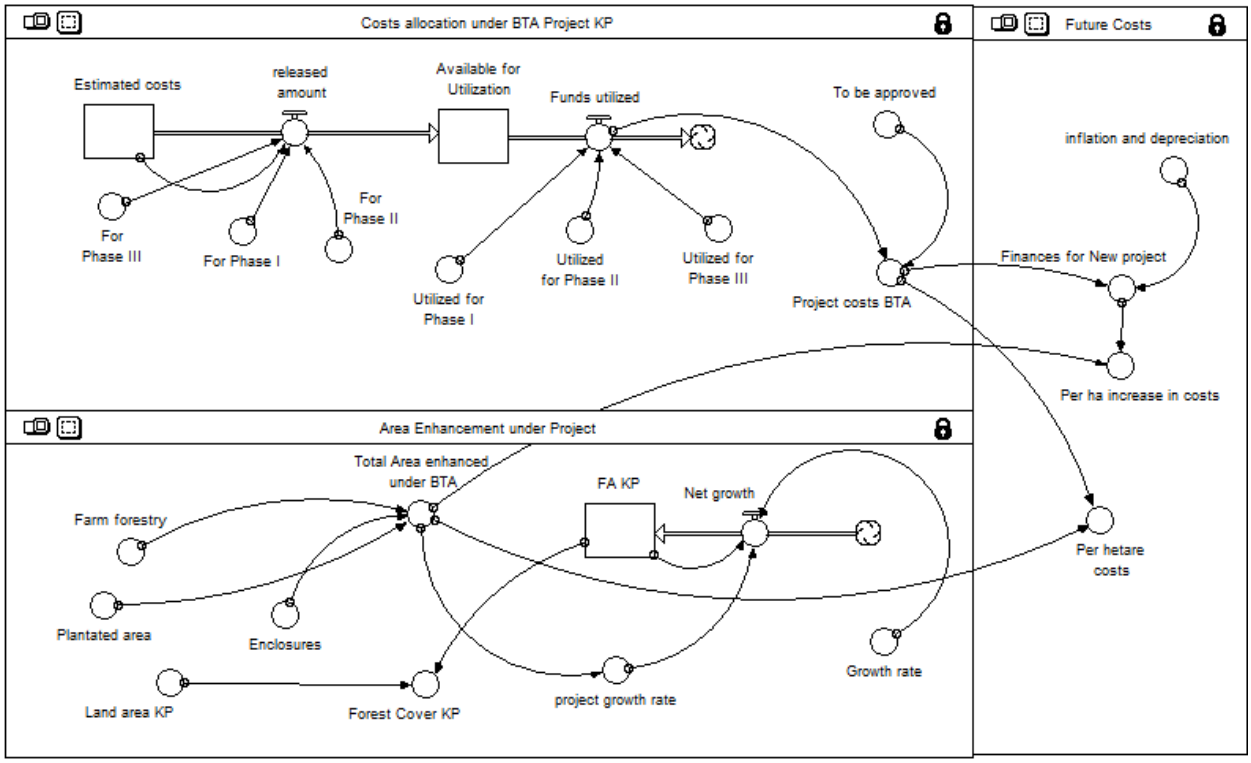

Figure 1 Physical and Financial Allocation: Systems Model for BTA Project

Equations:

The following Systems Model Equations based on Stella Model are as follows:

*Net Growth = If time>=1972 and time<=2012 then Growth rate*FA_KP else if time<=2018 then 0.01* FA_KP else project growth rate* FA_KP*

Where Project Growth Rate = (KP forest area after Project period– KP forest area before project period)/ KP forest area before project period

*Forest Cover = (FA_KP/Land_area_KP) *100*

*Required Finances for New Project = (depreciation*Project costs BTA) +Project costs BTA*

Future costs of a project have been estimated by taking the depreciation of the currency during 2014-18. Model data has been validated in the light of the official data on forest area of KP. for the period 1972-2000.

Results and Discussion

a) *Physical and Financial Analysis*

The table 1 shows the break-up of BTA project estimated costs for three phases and thereby allocation to its key activities. Out of total estimated costs (Rs. 19448 m.), only 9.8% of the funds have been allocated to Phase-I followed by 50.5% and 39.6% of the total funds allocation to Phase-II (Rs. 9826.2 m.) and Phase-III (Rs. 7709.79 m.) respectively. Out of total funds allocated to Phase-I (Rs. 1911.99 m.), the highest allocation has been set for *Raising of New Departmental Nurseries and capacity building of farmers (74.4%).* Similarly, in Phase-II, the financial focus was on *Raising of New Plantations on Communal and Private lands and Outsource Plantation* with 51% share. In Phase- III, the highest share (34.9%) has been set for *Maintenance and Watering of Departmental Plantations.* Out of the total estimated costs of the project, highest allocation has been set for *Raising of New Plantations on communal and private lands/outsource plantation (38%),* followed by *Raising of New Departmental Nurseries/ capacity building of farmers (19.7%). Farm Forestry, Promotion of non-timber forest products,* and *Promotion of Forest based cottage industries* are the areas that have been given low priority while estimating finances for the project.

Table: 1 Share of All Phases and Activities in Project Finances (Rs. in million)

Activities / Date	Phase I (Share %)	Phase II (% Share)	Phase III (Share %)	Total Estimated Costs	Total share (%)
Closure and Maintenance of Enclosures	6.07	7.32	29.24	3089.79	15.89
Raising of New Plantations on communal and private lands/outsource plantation	10.79	51.08	28.07	7389.95	38.00
Maintenance and watering of departmental plantations		0.51	34.95	2744.92	14.11
Maintenance of Sowing and dibbling		1.98	2.05	353.4	1.82
Farm Forestry/Free Distribution		0.2		20	0.10
Raising of New Departmental Nurseries/ capacity building of farmers	74.43	22.39	2.78	3838.04	19.73
Operational Cost for field formations including CCFs, DCCF and CFs			0.43	33	0.17
Support Activities of Integrated Specialized Units	0.58	1.68	0.35	202.84	1.04
Consultancies	0.03	0.2	0.13	30.5	0.16
External Monitoring	0.52	0.1	0.13	30	0.15
Publicity & Extension	0.78	0.2	0.13	45	0.23

Establishment	0.6	0.28	1.32	140.87	0.72
Machinery & Equipment	1.95	0.68	0.05	108.53	0.56
Repair and maintenance of Existing Vehicles		0	0.04	3.2	0.02
Operational cost of PMU/ rewards	0.84	0.59	0.32	99	0.51
Rehabilitation of degraded watersheds	0.63	0.41	0	52	0.27
Reclamation / Rehabilitation of bad sites through soil water conservation measures, bio-engineering structures and planting of drought resistant species.	1.26	0.97	0	119	0.61
Reclamation of saline and water- logged areas	0.35	0.57	0	62.75	0.32
Planting of road, canal and railway tract	0.82	1.29	0	142.62	0.73
Improvement of Rangelands and Pastures	0.24		0	4.5	0.02
Promotion of Forest based cottage industries related to Mazri and Kana	0.07	0	0	1.32	0.01
Promotion of non-timber forest products like medicinal plants, mushrooms and honey	0.05	0	0	1	0.01
Collection and storage of seed	0	0.13	0	13	0.07
Woodlot/owners' plantation	0	9.39	0	922.75	4.74
GT (Phase I, II, III)	**100**	**100**	**100**	**19448**	**100.00**

Source: Information based on PC 1- Phase I, Phase II, Phase III

Table (2) highlights the classification based on *Afforestation, Regeneration and Rehabilitation* activities. Out of total estimated costs, about 59.5% has been planned for *Afforestation followed by Regeneration and Rehabilitation (17%).* Rest of the activities including *Operational Costs, Promotion of Cottage Industries and Promotion of Non-timber Forest Products* have been allocated about 23% of the total finances. Our classification and estimation further show that *Afforestation and Regeneration* along with *Non-timber Forest Products and cottage industries* would create *Employment* under the project. According to the total project estimated costs, about 95% of the funds under these different sub- activities would create employment opportunities.

Table: 2 Classified Project Activities and Estimated Costs (Rs. in million)

Activities	**Estimated Costs (Rs. m.)**
Afforestation Activities	

Planting of road, canal and railway tract	142.62
Raising of New Plantations on communal and private lands/outsource plantation	7389.95
Maintenance and watering of departmental plantations	2744.92
Maintenance of Sowing and dibbling	353.4
Farm Forestry/Free Distribution	20
Woodlot/owners' plantation	922.75
Sub-Total	**11573.64**
Regeneration and Rehabilitation Activities	
Closure and Maintenance of Enclosures*	3089.79
Improvement of Rangelands and Pastures	4.5
Rehabilitation of degraded watersheds	52
Reclamation / Rehabilitation of bad sites through soil water conservation measures, bio-engineering structures and planting of drought resistant species.	119
Reclamation of saline and water-logged areas	62.75
Sub-Total	**3328.04**
Others	
Publicity & Extension	45
Promotion of non-timber forest products like medicinal plants, mushrooms and honey	1
Promotion of Forest based cottage industries related to Mazri and Kana	1.32
Raising of New Departmental Nurseries/ capacity building of farmers	3838.04
Collection and storage of seed	13
Establishment	140.87
Machinery & Equipment	108.53
Repair and maintenance of Existing Vehicles	3.2
Operational cost of PMU/ rewards	99
Support Activities of Integrated Specialized Units	202.84
Operational Cost for field formations including CCFs, DCCF and CFs	33
Consultancies	30.5
External Monitoring	30
Sub-Total	**4546.3**
Total	**19448**

Source: Calculations based on Estimated Costs of the Project
*Closures are partly situated in already declared Forest area and partly new enclosures have been made to add new area.

Table 3 highlights the information regarding estimated costs and released funds for the three phases of the project. Out of total estimated costs of the project, 66.7% of the funds have

been released. Phase wise break-up shows that out of total funds estimated for Phase-I, around 94.9% of the funds have been released. Further, about 84% and 37.3% of the estimated funds have been released for Phase-II and Phase-III respectively. To carry on the third phase till 2020, there is a need of Rs. 6864 m. which have not been released. If this amount would be released, the total released amount would be Rs. 19,846.58 m thus showing a deficit of 398.58 m. for the project. As compare to the estimated costs for Phase-III, about Rs. 4831 m. more funds are required to accomplish the tasks in Phase-III. In other words, out of the total deficit of the project, about 70.4% of the deficit is incurred by Phase-III alone.

Table: 3 Financial Position of the Project (Rs. m.)

Phases	Estimated Costs	Finances Released	Released Funds as Percent of Estimated Costs	Utilized Funds (% of Released amount)
Phase I (Nov. 2014-Dec.2015)	1912	1815	94.93	100
Phase II (Jan. 2016-June.2017)	9826	8289	84.36	100
Phase III (July. 2017-June.2020)	7710	2878.583	37.34	100
Sub-Total	19448	12,982.58	66.76	100
Funds need Approval for remaining period of Phase III	6864			
Total Project Costs (I, II, III)	**19,846.58**			
Costs Overrun	**-398.58**			

Source: Project Office, Billion Tree Project, Peshawar (July 2018).

The main target of the project is to enhance 2% area to forest area of the province. The three activities led to enhance forest area; *Enclosures; Plantation and Sowing; and Farm forestry*. The physical progress (Table 4) shows that *Enclosures* achieved more than 100% of its target (122%) and added 1.3% area to forest area. *Plantation and Sowing* achieved 173% progress and added 3.1% area. *Farm forestry* showed 80% of the progress and added 1.9% area to the forest area of KP. Altogether, these three activities contribute 6.3% area to forest area.

Table: 4 Physical Progress of the Project

Activity	Target (million)	Achievement (million)	Achievement (%)	Area Enhanced (ha)	Area added to forest area (%)
Enclosure	600	732	122	306983	1.3
Plantation, Sowing	200	347	173.5	226335	3.1
Farm Forestry	200	160	80	142,818	1.9
Sub-TOTAL	**1000**	**1239**	**123.9**	**676136**	**6.3**
Recovered from Timber mafia and land encroacher				140000*	
Grand Total				**816136**	**8.2**

Source: Calculations based on information taken from the BTA Project Office, Peshawar
**Since this area has already been under forest area, therefore is not claimed as addition to forest area.*

a) Validity of the Systems' Model

To validate model results for forecasting, model data has been validated by taking past data (1972-2000) on forest area. The graph shows the same trend throughout.

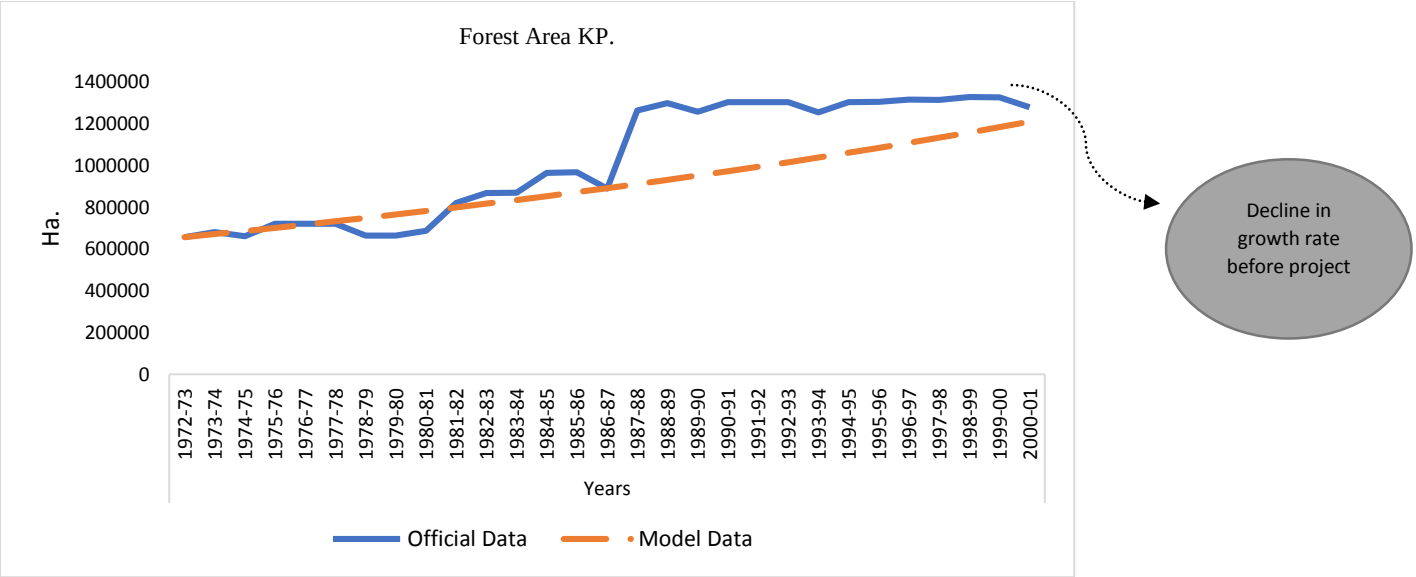

Figure 2 Validating Model Data on Forest area KP.

b) Forest Area: Forest Area with and Without BTA Project

Based on our calculations, the average annual growth rate in KP forest area has been estimated as 2.2% during the period 1972- 2000. In later years (2000-2018), the average growth declined to 1%. The total area enhanced under the BTA project (2014-18) is about 676136 ha. With this growth inclusive, the average growth rate in forest area has increased to 7%. The model-based projection shows that the forest area of KP would be 3588627.79 ha. in 2030. The forest cover would increase from 20.3% in 2012-13 to 24.5% at the end of the project (2020) of the geographical area of the province. Based on BTA growth inclusive, the forest cover is projected at 48% of the geographical area of KP. by 2030. Without the BTA project, this would be 1.9 million ha. showing only 25.5% forest covered area of the province by 2030; an increase of only 5.2% in one and a half decade.

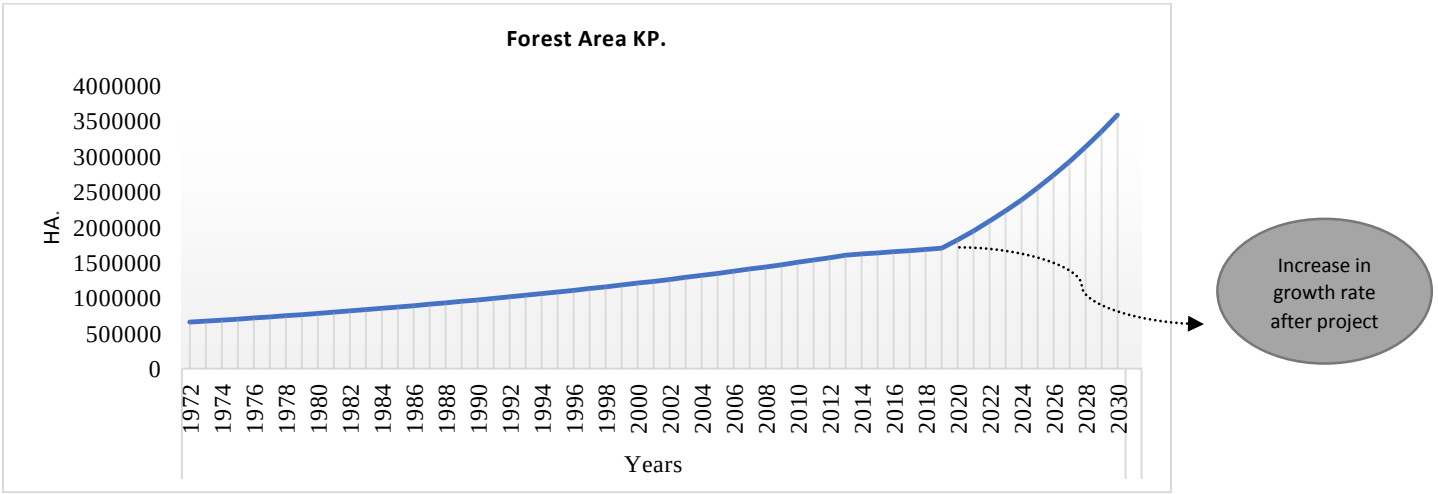

Figure 3: Forecasting Forest area KP.

c) *Future Afforestation Projects' Costs*

Sensitivity analysis has been done by taking depreciation of the currency that would result in costs escalation for any such future project. The value of the currency was Rs.124 to $1 in

August 2018[1]. This value, on average was recorded at Rs.101 to $1 in August 2014.[2] This means there is a depreciation of 22.7% (5.7% rate per annum) in the value of the currency during the project period. Any project that would be implemented after 2018, would need more funds. We take sensitivity analysis by counting depreciation of currency to the project costs in future. Other things remaining the same, taking project costs, including costs for the remining period of Phase III, i.e. Rs. 19846.58 m., there would require an additional amount of Rs. 1131 m. Thus, an amount of Rs. 20977.8 m would be required in 2021 to have a similar project in the country.

Under the Green Growth Initiative (GGI) in 2014, the BTA project, initially known as Billion Trees Tsunami Afforestation (BTTA) project, had been launched, setting a target of 2% increase in forest area through 30000 ha. additional land into forests annually, to involve local communities through BTA campaign, and to increase forest density of 7% degraded forests. The target was to rehabilitate 311,282 ha depleted forests. The objective of BTA project was to design and implement GGI (Govt. of KP., 2015). The *BTTA* project is headed by the provincial government of KP and its success has motivated another program called "Green Pakistan Project (GPP)" at the federal level. The program has been prepared for 6 years. Phase-1 of the Project was for one year ended in June 2015 and Phase-II had been prepared for January 1st, 2016 to December 31,2016, later extended till 30.6.2017 but bore the same costs. Phase-III will end in June 30th, 2020 (Govt. of KP., 2017). The project covers all twenty-eight (28) Forest Divisions of KP. The third-party monitoring report gave a high value to the project. World Wide Fund for Nature (WWF) has declared it a successful project (WWF-Pakistan, 2017). The project envisaged to add 30,000

[1] https://www.investing.com/currencies/usd-pkr-historical-data

[2] https://www.opfblog.com/7786/historical-chart-of-pakistan-rupee-exchange-rate-vs-us-dollar/

ha. additional area into forests annually. Our results show that an area about 169000 ha. have been added on annual basis during 2014-18. Thus adding 6.3% area to forest area instead of 2%. However, there are some observations regarding the afforestation classes. Much of the area growth has been achieved under *Plantation on Communal and Private lands. Farm forestry* contributed only 1.9% area to the forest area. It has been observed that if some parts of the BTTA project could reach the local government, the results could be further improved. The local government comprises of district government, tehsil and town municipal administration, and village and neighborhood councils. Among these, the village and neighborhood councils can be more responsible as, according to the compendium of rules of business- 2015, promotion of plantation of trees and land-scaping falls under their jurisdiction[3]. The elected councilors from all 3,493 village and neighborhood councils could be effectively made use of to excel *BTA* project.

One of the important reasons of failure of forestry projects across countries is that the baseline indicators are missing thus resulting in defective impact analysis. The BTA project has the baseline indicators for watershed, afforestation and density improvement (Govt. of KP., 2016). The baseline for the project has been established by using 2013 Satellite imageries up to June 2015 (Govt. of KP., 2015), thus providing a sound ground for impact analysis. The funds for the project had been allocated from the Annual Development Plan. However, the payment has been made in installments based on the performance of the work done and verified by the third party that will evaluate and assess the performance from randomly selected project areas. The operational costs have not been a problem as the project tasks have been done by the existing staff and infrastructure of the Forest Department. The project envisaged to create more than 50,000 jobs. There is a need of separate survey about the aforesaid number. However, the project activities show that jobs have

[3] The Khyber Pakhtunkhwa, Village and Neighborhood Councils Rules of Business, 2015, PP. 10

been created to plant trees, run nurseries, to supply seeds and equipment and to establish non-timber forest product businesses. Besides, some new and some previously established organizations and committees; Women Organizations, Joint Forest Management Committees (JFMC) and Village Development Committees (VDCs) have been established or reactivated.

Pakistan can learn lessons from the regional countries to handle different issues of the project. For example, the Three North Shelterbelt project of China is being criticized for China's rush to plant trees. It was not clear that how much is the dying rate of the trees and how much these trees help in drought and soil erosion (Lao, 2016). In Indian case, roughly 60 per cent of the saplings planted in different areas are expected to survive; rest expected to die due to lack of water or diseases (The Telegraph, 2016). The Indian plan is also being criticized as there is currently no mechanism defined to monitor the scheme to check the direction of funds especially under the shadows of corruption. Reports are there to burn out own patches of forest not reaching to targets and then blaming forest fires for that. There are problems to find new patches of land to reforest, if not found, will lead to turning over agricultural lands (Davis, 2016).

Summary

Natural resource estimation and analysis is a deficient area of research in developing countries like Pakistan. The country has very meagre forestry resources. Following the international drive to plant billion trees, Khyber Pakhtunkhwa government followed the suit by launching Billion Trees Afforestation Project in the province in 2014. The project was designed for four years (2014-18) with a follow up of two more years till 2020. The target of the project was not only to enhance forest area (2%) but also to create employment (50,000 jobs) and to rehabilitate bad sites. The present research applied Systems Dynamic modelling to estimate forest area growth by incorporating the area planted under the project. This new methodology is based on mathematical

equations by taking key components of the system. Further, Phase-wise costs on around twenty-four (24) heads have been tabulated to calculate the fund allocation to each activity. Plantation on communal and private lands got highest priority. Farm forestry got insignificant share. The study also classified the project activities based on Afforestation, Regeneration/ Rehabilitation and Employment. These informations have been collected from the project office. PC-I and PC-II documents have been used to get the additional information. The focus of the study was to classify the project activities, to check their financial share and to estimate the forest area of KP. The results show that 59.5% of the funds had been estimated for Afforestation followed by Regeneration and Rehabilitation, Promotion of Cottage Industries and Promotion of Non-timber Forest Products. The estimated results with and without project share to KP. forest area show that the project has contributed more than what has been initially proposed. These calculations helped us to estimate the future costs of such a project.

Conclusion

Environmental resources play a vital role in the economy. Environmental resource evaluation is a part of development process that helps in achieving sustainable development goals of an economy. Evaluation of such resources is difficult in the absence of database. It is important that a database should be built up by designing baseline studies through estimation and analysis of these resources. The present study is such an effort that takes an on-going forestry project in Pakistan, considers key targets of the project and funds allocated thereto. The project got momentum in the international arena due to its ambitious targets of planting billion trees across KP. province and creating thousands of jobs for the local community. The present study has designed a Systems Dynamic model and estimated the area growth and financial resource allocation. This helped to estimate funds required for a similar project in future. There is a need to extend the model to other

aspects of the forest economy; for example, forest area growth and land use changes, wood stock increase, forest cover and carbon emission effects in the study area etc.

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