

Green supply chain management practices as a key solution to maintain environmental security and sustainability

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Abstract: Environmental security and sustainability are complementary approaches to comprehend and resolve environmental problems. There is a convergence between traditional national security thinking and environmental protection and policy development. Sustainability policy provides many answers to the macro-problems like biodiversity loss, climate change, and nuclear power. As a constant pressure were there to implement GSCM practice to improve the environmental, social, operational, economical performance on almost different kind of business, so the focus of the study has become GSCM's efficiency in maintaining environmental security and sustainability in terms on environmentally and economically. The objective of the study is also to identify which practice helps the organization most in improvement of environment as well as economy. The study is done on some manufacturing industries situated in and around Bangalore India and taken place on 60 managers, production engineers responses from those SME's. It provides interest to the other researcher to study thoroughly on different GSCM practices and their impacts on environmental and economical improvement.

Keywords: Environmental security, Environmental sustainability, Economical, Social, Operational, Environmental performance, Biodiversity

1. Introduction:

Environmental security is considered in a different manner in the twenty-first century as sustainability and natural resource protection have become most inevitable elements of national security and foreign policy. Environmental security and sustainability are two approaches to comprehend and resolve Environmental problems. As a way forward this paper proposes a framework for identifying the environmental problems like global warming, green house gas effect, ozone depletion, bio diversity loss, scarcity of natural resources which are considered as security issues. Moreover, over the past few decades, environmental issues have created social, economic, and political pressure on organizations to implement green practices in manufacturing activities. The average temperature of the earth has been rising and greenhouse effects have led to an increase in the occurrence of natural disasters.

Consequently, the importance of green practices has received a lot of attention from both academic researchers and operations management personnel. Further, stakeholders have influenced firms to adopt environmental practices that control their impact on the natural environment. While firms in the supply chain have made collective efforts in response to pressures from stakeholders regarding environmental issues, they must deal with intense market competition, changes in the business environment, and supply disruptions (as a worst case scenario). Thus, supply chain managers must find solutions that address both environment protection and performance improvement; this can be achieved by implementing GSCM (that is defined as the integration of environmental concerns with supply chain management (SCM) practices Green purchasing and procurement

- Green manufacturing
- Eco design and packaging
- Green distribution
- Reverse logistics

Rising emission of green house gas, fast depletion of scarce natural resources, growing waste generation and pollution raises concern for green manufacturing. It is a production process which use inputs with low environmental impact highly efficient and does not generate pollution. It involves transformation of industrial operation in 3 ways –

1. **Using green energy.**

2. **Developing and selling green products.**

3. **Employing green processes in business operations.** It can lead to gain production efficiency, reduced environmental and occupational Safety expenses, lower raw material cost.

Green packaging consists of :

- Downsize packaging.
- Use green packaging materials.
- Cooperate with vendor for standardized packaging.
- Minimize material uses and time to unpack.
- Encourage returnable packaging method.

- Promote recycle and reuse programme.
- Different companies like Dell, pepsico using packaging materials from unexpected sources like bamboo, mushrooms, wheat straw. Dell has become leading innovator in sustainability. There are some activities which are taken care of for green logistics. They are as follows:

- Deliver directly to the user site.
- Distribute the product together in a big batches rather than in smaller batches.
- Alternative fuel vehicles.

The logistical activities comprise of freight transport, storage, inventory management, materials handling and all the related information processing. The main objective of logistics is to co-ordinate these activities in a way that meets customer requirements at minimum cost

Environmental degradation, resource depletion and natural disasters may have direct implications for the security of individual States, group of States and of the international community as a whole. Moreover monitoring and coordinating regional environmental cooperation in areas of actual or potential insecurity (hot spots), exchange of information and even joint management could be required. At the global level, the environmental security can be strengthened by: (a) preventing or mitigating global environmental degradation; (b) managing the global commons; (c) preventing and managing global risks; and (d) collecting and exchanging information on schemes of global environmental co operation and finally implementing green manufacturing to reduce the harmful impact of manufacturing in environment, green packaging by using led free material ,intoxicating material in packaging which are biodegradable. Moreover to achieve environmental security, it requires support action in the following areas: (a) education, training and exchange of information; (b) capacity building in elaboration of national and international law. This would be best achieved through defining eco-geographical regions and international institutions.

1.1 Environmental security:

In the 1980s with the emergence of global environmental problems such as the depletion of stratospheric ozone or global warming gained momentum. Environmental security initially appeared to be a good idea, as it was ‘meant to alarm traditional security analysts about the issues that “really” matter’) and to increase the relevance of environmental problems in the political agenda.

The concept of environmental security, is different from its potentially heterodox human security. In contrast to sustainability, however, environmental security has performed poorly in terms of policy formulation. This is a function of its short history, its interdisciplinary nature, and its ambiguity. It is also a function of disagreements about which environmental problems can rightfully be called 'security' issues.

It argues that environmental security does not necessarily demand new policies, but it needs a renewed effort at implementing existing sustainability policies and new forms of governance.

2. Literature review:

- [Buzan](#) emphasized that ‘environmental security concerns the maintenance of the local and the planetary biosphere as the essential support system on which all other human enterprises depend’ (1991, 19–20). [Dyer 2001](#), 68 claimed that it is the value traditionally associated with the nation-state—identity, territoriality, sovereignty—and implies a different set of values associated with environmental change—ecology, globalism, and governance

- Yet [Thompson](#) argued that ‘environmental security ... is all about solidarity’. On analytical grounds, it seemed a way to provide a better account of new typologies of vulnerability as well as the potential for conflict and violence with which these vulnerabilities could be associated.

- According to [Deudney](#) the term ‘security’ evokes a set of confrontational practices associated with the state and the military which should be kept apart from the environmental debate. Concerns included the possibilities of creating new competencies for the military—militarizing the environment rather than greening security ([Käkönen 1994](#))—or the rise of nationalistic attitudes in order to protect the national environment ([Deudney 1999](#), 466–468)

- [Deudney](#) argued that not only are practices and institutions associated with national security inadequate to deal with environmental problems, but security can also introduce a zero-sum rationality to the environmental debate that can create winners and losers, and undermine the cooperative efforts required by environmental problems.

Securitization is considered as the social construction of an issue as a security issue, a reflexive process that is not only ‘rule-bound but also ‘rule altering’.

2.1 Research gap: Different researcher has explained thoroughly on environmental security and sustainability but none of the study explore the influence of GSCM practice to maintain environmental security and sustainability though they had mention the important ways to get environmental security and sustainability. This gap interested the researcher to do the study.

3. Hypothesis:

- GSCM practices has positive impact on environment thus maintain environmental security and sustainability.
- GSCM practices has positive impact on economical performance thus maintain environmental security and sustainability.

Research Methodology

4.1 Type of research: Explorative and Descriptive.

4.2 Sample size : The study has taken among 60 departmental heads and managers of some 10 companies who already had implemented GSCM practices in their organizations. The study has done on some specific manufacturing and service sector based on penneya, Bangalore.

4.3 Sampling Technique : Stratified random sampling technique and convenience sampling .technique are used

4.4 Data Collection: Two types of data are collected. Primary data collected through Google sheet with a structured questionnaires . Secondary data collected through different online and offline journals, books, websites.

4.5 Development of questionnaire: Questionnaire is made with some close and open ended questions to collect nominal and ordinal data. Reliability check is done through Cronbath's alpha with .987 . Validity of construct and content is checked through pilot study done on some of the related and important questions with colleague professors, guide, some operations management experts.

4.6 Tabulation, Analysis, Interpretation of data: Consolidated for the proposed study in a tabular form, analyzed them with mean, Percentage frequency , done Correlation to understand the relation between GSCM practices with Environmental security and sustainability and interpreted them into pie chart and Bar graph.

5. Data Analysis: Depending upon some 12 -15 questions responses are categorized as follows. The 5 scale study has been taken where strongly agree (S.A) is considered as 1 and strongly disagree (S.D.A) is considered as 5.

GSCM practices consists of Green manufacturing, green procurement, green packaging, reverse and green logistics. There are some analysis on nominal and ordinal data as follows:

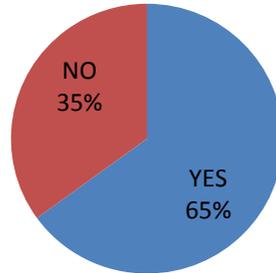
QUESTION	YES	NO
Do you believe that GSCM practices in the organization can maintain environmental security?	65%	35%
Can GSCM practice help organization to maintain environmental sustainability?	74%	26%
Do green manufacturing help in conservation of natural resources?	56%	44%
Do green manufacturing optimised the use of material by minimizing it's waste?	67%	33%

ANALYSIS & INTERPRETATION:

- 65% respondents of the study believe that GSCM practices can maintain environmental security whereas 35% of them denied the statement.

Maximum number of people agree that GSCM practices may influence in environmental security as GSCM is such an approach which will help to reduce the cost, increase the profitability thus improve financial condition make environment much secured.

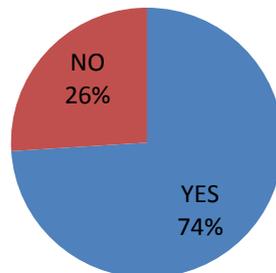
Do you believe that GSCM practices in the organization can maintain environmental security?



- 74% respondents of the study believe that GSCM practices can maintain environmental sustainability whereas 26% denied the statement.

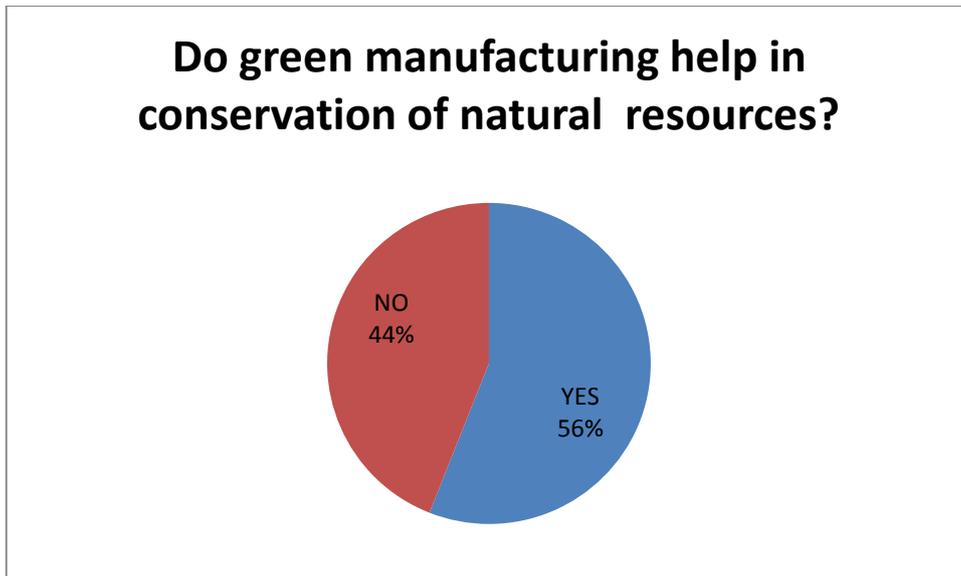
Maximum number of people of the study agreed that GSCM practice perhaps influence the environmental sustainability as GSCM practices follows green manufacturing, order their material from green partners, green packaging, green logistics all of them obviously reduce the harmful impact in environment and maintain sustainability.

Can GSCM practice help organization to maintain environmental sustainability?



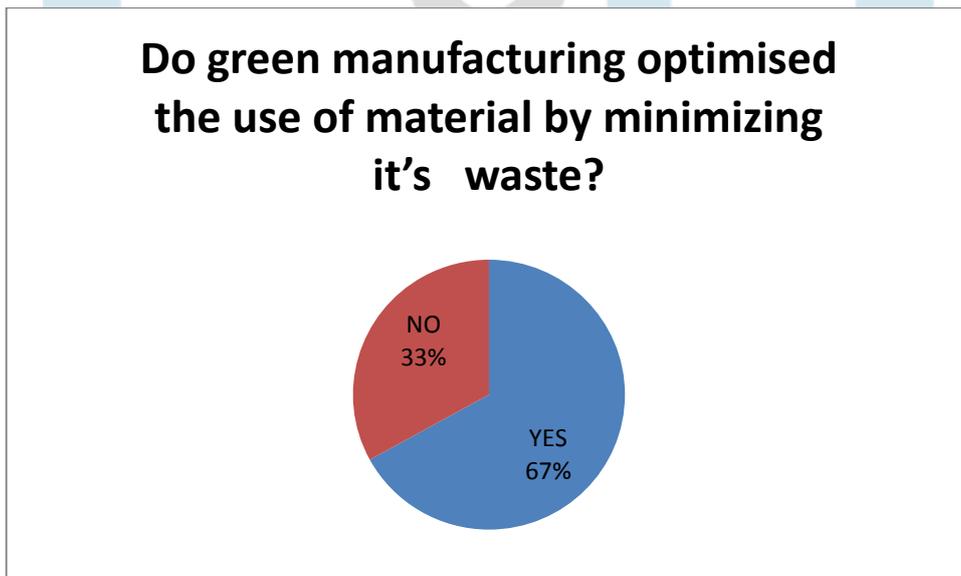
- 56% respondents agree that Green manufacturing help in conservation of natural resources whereas 44% denied the statement.

Maximum number of people of the study agreed with the statement as green manufacturing is such a process which help organization to optimize use of natural resources as raw material or as non-renewable source of energy. Thus green manufacturing may conserve the natural resource specially those resources which are non-renewable.



- 67% of the respondents believe that green manufacturing optimised the use of material by minimizing it's waste whereas 33% do not agree that green manufacturing really have any impact on optimizing of material use.

Maximum number of people agree the statement because green manufacturing based on 3R's (Reduce-Reuse- Recycle) so it is obvious that green manufacturing helps to reduce the waste of material and use the same material after recycling the used products. Thus may help to get the profit and improve the economical performances and simultaneously by recycling the scrap clean the environment improve environmental performance.



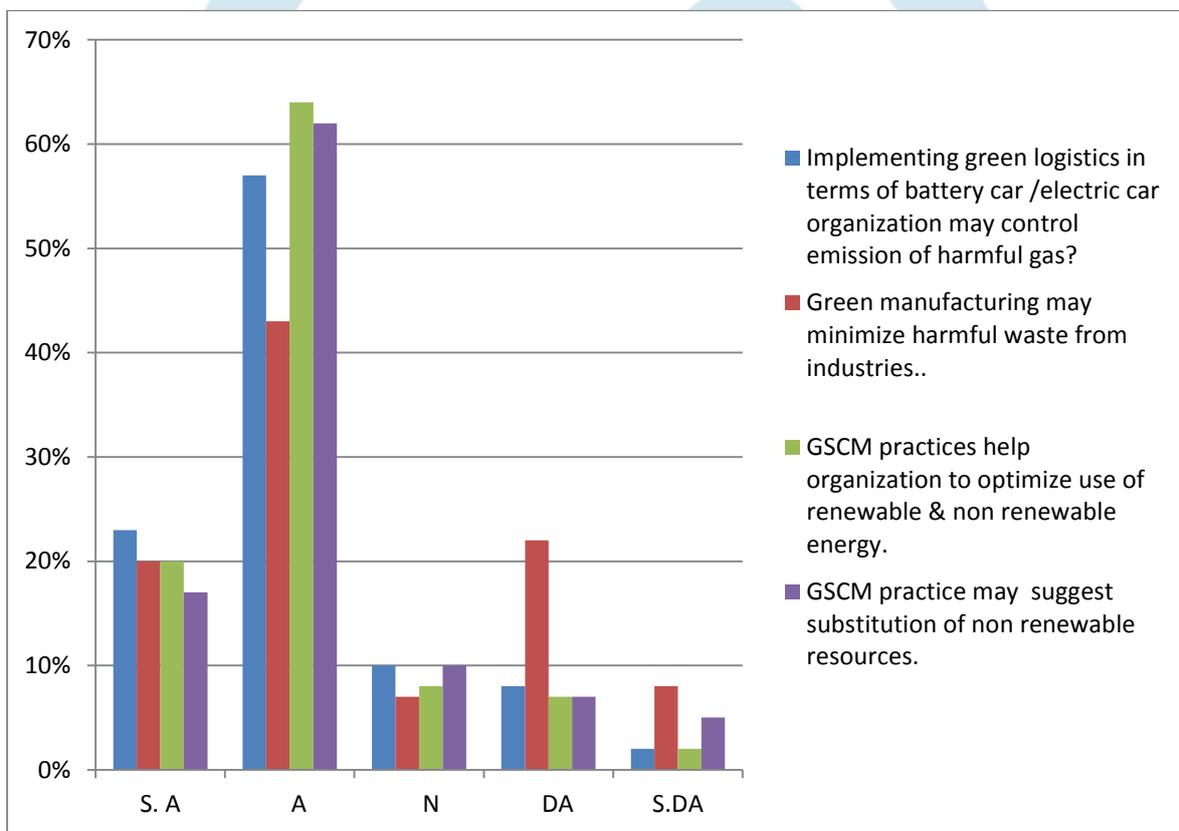
QUESTION	S. A	A	N	DA	S.DA
Implementing green logistics in terms of battery car /electric car organization may control emission of harmful gas?	23%	57%	10%	8%	2%
Green manufacturing may minimize harmful waste from industries..	20%	43%	7%	22%	8%
GSCM practices help organization to optimize use of renewable & non renewable energy.	20%	64%	8%	7%	2%
GSCM practice may suggest substitution of non renewable resources.	17%	62%	10%	7%	5%

Analysis & Interpretation:

80% of the respondents agreed and highly agreed with the comment that implementing green logistics like battery car, electric car which does not emit harmful gas and not only that they don't use renewable energy but total 10% disagreed and highly disagreed with the statement, whereas 10% are neutral.

Maximum number of people agreed with the statement perhaps due to the reason that as companies who opted green logistics use battery car/electric vehicles operated by battery and electricity do not emit any gas so they are provide 100% pollution free environment. Thus help to main environmental sustainability.

- 63% respondents agreed that green manufacturing is the process of producing products by minimizing harmful waste from industries but 30% denied the statement whereas 7% are neutral may be they are not confirmed that green manufacturing actually reduce the harmful waste from industries.
- 84% respondents agreed that GSCM practices help organization to optimize use of renewable and non renewable energy whereas 8% respondents are neutral and 9% respondents disagreed with the statement .
- 79% respondents agreed that GSCM practices suggest substitution of non-renewable resources but 12% denied the statement where as 10% people are neutral in this statement.



6. Findings:

The focus of the study is how GSCM practices help in gaining environmental security and sustainability.

According to the above chart respondents strongly agreed most on the statement that implementing green logistics through battery car/ solar car control most the emission of harmful gas, followed with the statements that GSCM practice help organization to optimize use of renewable and non renewable energy and green manufacturing may minimize the harmful waste from the industries. So it is clear that GSCM practice really helpful in conservation the renewable and non renewable resources as well as energy, thus a big solution of environmental degradation and resource depletion, indirectly helpful to maintain environmental security and sustainability.

Respondents agreed most in the statement that GSCM practice help to optimize the use of natural resources, followed with the statement that GSCM practice may be alternative practice for environmental sustainability.

Climate change can be viewed a threat to environmental security Human activity impacts CO₂ emissions, impacting regional and global climatic and environmental changes and thus changes in agricultural output. This can lead to food shortages which will then cause political debate, ethnic tension, and civil unrest.

Climate change also could, through extreme weather events, have a more direct impact on national security by damaging critical infrastructures such as military bases, naval yards and training grounds, thereby severely threatening essential national defence resources.

RESULT AND FINDINGS:

Correlation between:

	GSCM practices in the organization can maintain environmental security	GSCM practice help organization to maintain environmental sustainability	green manufacturing help in conservation of natural resources	green manufacturing optimised the use of material by minimizing it's waste
Implementing green logistics may control emission of harmful gas	0.654	0.741	0.256	0.255
Green manufacturing may minimize harmful waste from industries..	0.687	0.951	0.265	0.375
GSCM practices help organization to optimize use of renewable & non renewable energy.	0.854	0.956	0.889	0.489
GSCM practice may suggest substitution of non renewable resources.	0.589	0.789	0.321	0.365

Findings:

- Implementing green logistics which will control the emission of harmful gas are well correlated with environmental security and sustainability but not significantly correlated with green manufacturing which help in conservation of natural resource and optimised the use of material .
- Green manufacturing may minimize harmful waste from industries is significantly correlated with environmental security and sustainability but less correlated with the concept of green manufacturing about it 's conservation of natural resource and optimise use of materials..
- GSCM practices help organization to optimize use of renewable & non renewable energy is significantly correlated with environmental security and sustainability and conservation of natural resources but less correlated with optimize use of raw material by green manufacturing.
- GSCM practice may suggest substitution of non-renewable resources is well correlated with environmental sustainability but not well correlated with environmental security , optimization of raw material use and conservation of natural resources.

7. Conclusion:

The study concluded with following conclusion:

- ❖ In GSCM practices organization's effort to conserve non renewable energy source and use renewable source or built proper infrastructure for energy plant. Thus GSCM practices maintain environmental security.
- ❖ Green manufacturing is such a practice in GSCM where less amount of harmful waste and gas will emit which help in environmental sustainability.
- ❖ It can be concluded that environmental security and sustainability can be acquired by implementing green logistics where battery / solar power operated car will be used which will emit zero percent harmful gas.
- ❖ Maximum number of people agreed the statement as optimize use of materials as well as energies are done by GSCM practice.
- ❖ Majority of respondents are agreed with the statement perhaps they believe that as in green practices non renewable energies specially solar, water and wind energies are used more than conventional energies so one way GSCM may be substitution of non-renewable energy.

The identification and formation of environmental security and sustainability threat implies the identification of the political community that deserves protection, the legitimization of the means to provide security and eventually their institutionalization. The analysis of environmental security discourses and the securitization of climate change have shown that transforming an issue like climate change into a security issue is not about applying a fixed meaning of security and the practices associated with it. Rather, it is a reflexive and contextualized process that generates meanings and practices.

Reference:

- [1] GBPIHED (2001). ENVIS Bulletin: Himalayan Ecology & Development, Volume 9, No. 2, 2001. G.B. Pant Institute of Himalayan Environment and Development.
- [2] Goswami, D.C. and Das, P.J. (2003). The Brahmaputra River, India: The eco-hydrological context of water use in one of world's most unique river systems. Ecologist Asia. Special issue on large dams in northeast India- Rivers, forests, people and power. 11(1):9-14.
- [3] ICIMOD (2008). Recorded proceedings of the two day 'Climate Change and Vulnerability of Mountain Ecosystems in the Eastern Himalayan Region, North-East India & Bhutan Stakeholders Workshop' 11-12 March, 2008, Shillong. Organised by International Centre for Integrated Mountain Development Kathmandu, Nepal IPCC (2007a). IPCC (2007b)..
- [4] ISDR (2002). Living with risk (a global review of disaster reduction initiatives). International Strategy for Disaster Reduction. Preliminary version, Geneva <http://www.cig.ensmp.fr/~iahs/maastricht/w4/w4706.htm>
- [5] Kron W. (2003). High water and floods: resist them or accept them? In: Schadenspiegel (Losses and loss prevention), 46th year. No.3. 26-34. Munich Re Group, Munich Li Tianchi, Pingyi Zhu and Chen Yongbo (2001). Natural Dam Created by Rapid Landslide and Flash Flooding from the Dam Failure in Southeastern Tibet, China, 2000. Unpublished paper presented in the Regional Workshop on Water-Induced Disasters in the Hindu Kush Himalaya Region, 11-14 December 2001 in Kathmandu, Nepal.
- [6] Mirza, M.M.Q., Warrick, R.A., Ericksen, N.J. and Kenny, G.J. (1998). Trends and persistence in precipitation in the Ganges, Brahmaputra and Meghna river basins. Hydrological Sciences- Journal-des Hydrologiques. 43(6):845-858.

