# Integrated Development Model for Army Cantonments

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#### Introduction

The primary role of Indian Armed Forces is to safeguard sovereignty and maintain territorial integrity of the country. Although organised and structured to perform its assigned tasks; it also plays an important role in 'Nation Building'. Nation building encompasses vide range of issues from macro to micro, and is a multifaceted, multi dimensional developmental process. Infrastructure expansion is one of the principal factors contributing towards Nation building, which not only supports the State's positioning for development but also caters for growing population and economic demands.

Indian Army with its mammoth 1.2 million work force has acres of land under its possession as cantonments / military stations and various other establishments. At the first glance the Army cantonments with their picturesque locations, layouts, parks, play grounds, environmental training areas and scenic beauty stand out from rest of the places. However, a closer look at the cantonments has a different tale to narrate; by and large poor and disoriented layout, portraying lack of foresight and planning. Most of the constructions are undertaken piecemeal without any concrete futuristic plan. Majority of these are developed on need basis and based on the personality of the Commanders. Although, of late sufficient ground has been covered in terms of planning process, much more is desirable for all round improvement; indeed a right time to formulate a uniform policy for all developmental projects.

Army's unique, non-violent and productive role in well-being of the environment, creating social and security patterns founded on cooperation and non confrontational approach has always been acknowledged and recognised. It has been a leader in true sense and has many firsts to its credit; in fact in several fields it has served as a role model for others to imbibe. This write up is a modest attempt to suggest a model for integrated development in Army cantonments and other military establishments.

#### **Objectives**

In the present context, the need is to develop cantonments into self sustaining military stations, in tune with the changing social needs of the society. This can be accomplished by planning cantonments more comprehensively based on integrated development model by integrating mankind and technology with nature, with the aim of restoring life's harmony, completeness and fulfillment in the living process2. The integrated development model has been suggested to achieve following objectives:-

- (a) It should reflect a holistic and integrated vision of the planet 'earth', in its most natural form.
- (b) As a part of an integrated urban whole, they should contribute in solving larger urban and environmental problems.
- (c) The integrated model should use sustainable design, construction, and management practices to reduce resource inputs and waste outputs. The use of recycled materials can be suitably incorporated for enhanced effect.
- (d) Environment integration should no longer depend on picturesque aesthetics to communicate the idea of nature. Rather, they should form part of expanded fields of the landscape available.
- (e) Integrated development should serve as a vehicle for reconnection. Eco friendly buildings, parks and environmental training should provide opportunity for passive contacts with nature, as also generate deeper understanding on issues of environmental protection and conservation.

#### **The Concept**

Today when we speak about integrated development, it is important to start at the beginning, with the idea of nature. It should be designed with the aim of providing an aesthetic experience of nature as an antidote to urban life. In consonance with its vision, the first step is to create a clean pollution-free environment, where life can coexist with nature in complete harmony. To achieve this, the canvass has to be broad with a goal to create infrastructures which are 'friendly' to the population at large and in harmony with the environment. Today, life being an ordeal of long distances, cantonments need to be evolved with a rationale of developing all the vital amenities and institutions that the residents need as close as possible.

They need to be a model of all inclusive and holistic growth. This can be achieved by integrated development, with a walk to work-home-recreation lifestyle, futuristic residential models, contemporary commercial zones, and basic educational institutions. With its immaculate construction practices it should also be known for its uniqueness and novelty furthering eco-friendly vision.

#### **Green Architecture**

Green architecture is a sustainable method of design and construction with environment as the backdrop. Green architects generally work with the concept of creating energy efficient and environment friendly structures. The

natural ecology of the planet is taken as the macro sculpt to be used as a model for designing green infrastructure. The architecture is centred on the planetary system as the theme to create natural environment, in terms of materials used, space to be occupied and incorporation of energy efficiency utilities, including use of solar technology

Green architecture is a perfect tool and a wonderful example of the possibility of humans living harmoniously within the environment. The existing opportunities need to be exploited to design aesthetic, energy efficient and environmentally friendly living and workplaces that can demonstrate human ability to adapt to peaceful living, within the ecology of the natural world.

### The Integrated Model

Army's environmental focus needs to be oriented towards providing eco-friendly infrastructure with state-of-theart facilities contributing towards creating model projects for the future. The cost-effective integrated building concepts can be adapted to everyday home living, with modifications to suit the requirement of the area, topography and the weather conditions. The construction model needs to be a platform for sustainable green development with all the elements designed to have minimal impact on the environment. The issues that need to be factored for development of the desired model are described in the succeeding paragraphs.

**Organisational Orientation.** First and foremost requirement is to have an organisation committed and oriented towards nature conservation and environmental issues. The key is to get familiarised with the vocabulary associated with green infrastructure and design initiatives. Equally important is to understand the concepts of sustainable landscapes and high-performance energy efficient building designs. Besides the basic frame work, the organisation needs to draw on the local knowledge and global expertise involving the following;

- (a) Incorporating the concept of 'think globally act locally'.
- (b) Accountability for 'global warming' is of utmost importance. Adoption of new methods, to reduce greenhouse gas emissions, carbon dioxide production, ozone depletion, environment destruction and soil erosion will have to be meticulously planned.
- (c) Another important parameter is adoption of green building management techniques. Environment friendly technologies and sustainable solutions need to be incorporated into all designs.
- (d) Adoption of the principle of 'reduce, reuse and recycle' for implementation of green solutions and to maximise output.

**Sustainable Development Concept.** Concept of sustainability signifies foresight to achieve long-term viability of projects based on comprehensive design initiatives and integrated approach. Land, water, energy, air and management of wastes have been identified as the focus area for tackling various sustainability related issues5. This has to be complimented with quality in construction, innovation in design, immaculate planning and focussed vision satisfying various social, economic and environmental parameters. Management of space, for different uses viz offices, training areas, educational facilities, residential complex, hospitals and commercial zone, needs orientation in such a way that they do not interfere with each other's functioning but at the same time present a integrated look, meeting all requirements and aspirations of the inhabitants.

**Energy Efficiency Systems.** Army cantonments practice numerous techniques for conservation and betterment of the environment. However, for enhanced effect and meaningful contribution towards reducing 'Global Warming', sustainable energy systems need to be adopted on a large scale. Some of the measures that can be incorporated are as follows:-

- (a) Constructing energy efficient buildings including use of energy efficient appliances, solar panels and heat pump technology. Cantonments have the potential of becoming one of the largest residential Solar Water Heating users in the country. This will not only save power and money but also contribute towards environment-friendly practices.
- (b) Designing passive solar energy facilities for homes using concrete floor thermal mass and pumice under floor insulation.
- (c) Use of centralised plumbing, insulated hot water cylinders and 'lag' hot water piping.
- (d) Use of green materials, including wood, stone, earth and recycled waste materials. Reducing this mounting level of waste is critical if we are to avoid having to build additional landfills and marring our landscape and water systems.
- (e) Biogas plant can be installed wherein biodegradable waste can be put through a process to produce non-polluting biogas which can be used to generate power to operate a major percentage of garden pumps. This will lead to saving of power which indirectly translates to power generation.
- (f) Use of appropriate and innovative technologies including fitting of low power consumption lights for lighting up streets and common areas.
- (g) Commissioning of electric and battery operated vehicle for administrative and security duties wherever feasible.

**Water Conservation.** Army cantonments can be made self sustaining in terms of water by efficient water management practices. Fresh water should be used only for drinking, cooking, washing, bathing and various toiletry requirements. The balance should be met out of recycled and use of waste water. Some of the methods for conserving water are as follows:-

- (a) Rainwater harvesting system to canalise water from terraces needs to be planned for, over natural wells, for recharging bores and artificial lake as also raising ground water levels. Rainwater collected can also be utilised for external use like watering of gardens, cleaning vehicles etc.
- (b) Waste water recycled with sewage treatment plants can be used for gardening purpose via the

conserving drip irrigation and sprinkler distribution system.

- (c) Reducing irrigation and surface water run-off. The same can be harvested by 'zero run off' layouts restricting outflow of water.
- (d) Inter-locking paving blocks and cutout grass concrete pavers assist in raising groundwater levels.
- (e) Use water conserving appliances including toilets, showers, taps, washing machines and dish washers.

**Use of Building Materials.** Fly ash, which is an environmental hazardous waste produced by thermal power plants, can be used as a part replacement of cement and fine aggregates. Further, usage of fly ash bricks in construction will help in reduction of greenhouse gases, which are depleting the ozone layer. These bricks are superior to traditional bricks because of various reasons, viz good compressive strength, lesser breakage and wastages, better evenness and finish etc. As fly ash bricks are produced mechanically they are economical, good for all type of masonry work and absorb very less water. For every ton of fly ash used in construction, approximately one ton of carbon dioxide emission in environment is reduced, thus contributing towards pollution control. Some of the other building materials that are recommended for use are as follows:-

- (a) Sustainable, certified toxic treatment solid timber rather than processed composite sheet materials.
- (b) Low volatile organic compounds (VOC) and toxic-free paints, finishes and adhesives.
- (c) Natural floor surfaces such as tiles and linoleum.
- (d) Inert gypsum-based wall and ceiling linings.

**Health and Wellbeing.** Construction of 'eco-friendly buildings' will add to the overall excellence. The vision stems from a growing awareness that the homes in which we live, and the buildings in which we work, are not always as 'healthy' as we would like them to be. Sick building syndrome has been linked to respiratory problems, headaches, sore-eyes etc. Some of the measures to ensure general wellbeing of the inhabitants are as follows:-

- (a) Design a safe and user-friendly home meeting the basic physical, emotional and spiritual needs of the residents.
- (b) Consider healthy lighting, colour and sound, controlled temperature and humidity and good indoor air quality to enhance the living environment.
- (c) Reduce formaldehyde emissions and use pollution fighting indoor plants.
- (d) Create asthma aware homes i.e. not fitted with carpets, reduced ledges, low-allergen gardens etc.
- (e) Use integrated wiring system for lighting, power, security, fire alarm and audio facilities.

**Garbage Management.** The military stations/cantonments need to be designed on 'Zero Garbage Concept'. Ecofriendly practice of segregating tonnes of household and commercial garbage, every month needs to be done at the source. Every block should have three types of bins placed for organic waste, paper and recycled materials. Garbage collection for all the three types should be done separately. Further, every nursery should have biocomposte pits for generation of manure from garbage segregated at source in the cantonment. The composted manure can be used for nourishing saplings and shrubs. Thus, organic and biodegradable waste can be used as manure in nurseries after composting and the recyclable materials can be contracted for generation of cantonment fund. The non-biodegradable waste can be recycled in a way not hazardous to nature and disposed off safely. Similarly, solid waste and sewage disposal should be carried out in an orderly and eco-friendly manner7. Use of sewage treatment plants can be suitably incorporated.

#### Conclusion

In the modern world, infrastructures are largely responsible for the sense of stability of life. Hence the infrastructure of the cantonments and military stations power packed with amenities needs to be modelled with an objective of integrating mankind and technology with nature to create a complete living place. The immense stretches of land in the Army cantonments need to be designed with 'nature' as the theme, encompassing commercial zones, residential complex, schools, hospitals, shopping malls, and recreation places; complemented by verdant greens and pollution free ambience to achieve supreme settings for lively meaningful life with remarkable realities. The concept of integrated development, with nature as the background in the cantonment, will not only preserve the floral heritage of the area but it would also facilitate conservation – replicating architectural representation of the planet earth.

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