

Section III
Case studies and designing parameters

Ch.9. Eco community parameters

9.1 Designing considerations

9.1.1 Circulation

- Distribution of activities
- Street character

9.1.2 Spatial considerations

- Positive outdoor spaces
- Open space concept
- Concept of green areas
- Spatial qualities desired by various activities
- Degree of mixed uses

9.1.3 Massing

1. Determining the appropriate density

- based on permissible FSI
- based on available resources to support a sustainable development

2. Factors determining clustering

- scale of groupings
- household mix
- density

3. Concept of the built mass

- heights
- volumes
- relationship between closed and open spaces
- composition of built forms to enclose positive open spaces

4. Desired visual character

9.1.4 Graded transition

1. Work spaces, Public spaces to intimate spaces
2. Outdoors to indoor –interpenetrating
3. Light to shade
4. Acoustical factor
 - gradation of noise levels
 - Segregation of space as per their tolerable noise levels.
5. Nature/structure
6. Individual to collective

9.2 Planning considerations

9.2.1 sustainable urban planning

Design of Eco-industrial parks calls for strong integration into their communities. Sustainable urban planning seeks to integrate land use, transportation, waste treatment, and infrastructure into a unified plan optimizing community use of energy and materials. While seeking a healthy relationship to ecosystems, a sustainable community plan also addresses issues of social and economic justice.

Apart from the usual planning and design considerations there are the considerations for implementing Eco-technologies economically and efficiently. In addition to this there are those pertaining to the choice of building materials and the appropriate building technologies. Lastly, the available budget is a major design consideration. The following considerations may be grouped as follows.

9.2.2 Appropriate architecture

The fall-out due to the life styles and development strategies of the last 100 years in terms of inequity, growing pollution and depletion of natural resources, has made us all aware within the global community that the basic needs of the growing population will not be met through the conventional developmental methods, materials and technologies. As the need for land, food and housing increases rapidly, we are faced with the pressure of supply. The concept of development then needs to be re-examined to be able to meet the demand. We need to create and promote new approaches for a more accountable and sustainable future, where "solutions grow from place". Where there is 'ecological accounting' and 'equity in resource accessibility'.

Taking these criteria into account we need to examine how to evaluate and arrive at appropriate solutions for development in terms of shelter. The following write-up is an attempt towards that.

Analyzing the two words 'appropriate' and 'technology' could define appropriate technology.

Appropriate: - 'suitable' and/or 'right' solution, which is in context or is applicable to a particular situation.

Technology: - 'systematic application of knowledge put to some practical use'.

Appropriate technology is a term that can thus have multiple interpretations depending on the context, the end user and the generator.

9.3 Satisfaction of basic needs

The technology should contribute, directly or indirectly, immediately or in the near future, to the satisfaction of 'basic needs', such as food, clothing, shelter, health, education, etc.

It should produce goods and/or services accessible particularly to those "whose basic needs have been least satisfied".

9.4 Development in the overall sense

9.4.1 Resource development

It should make optimum use of local factors (manpower, capital, natural resources, etc.) by:

- Sustaining/generating employment with low capital/labor ratio.
- Saving/generating capital (low capital/output ratio).
- Saving/generating raw materials, including energy.
- Developing skills plus R&D and engineering capabilities.

It should increase the capacity to produce on a 'sustained and cumulative basis'.

9.4.2 Social development

It should reduce debilitating dependence and promote 'self-reliance' based on mass participation at the local/national/regional levels, enabling the society to follow its own path of development.

It should reduce inequalities between occupational, ethnic, sex and age groups, between rural and urban communities and between groups of countries.

9.4.3 Cultural development

It should make use of, or build on, the indigenous technical traditions.

It should blend and enhance valuable elements and patterns in the local/national/regional culture.

9.4.4 Human development

It should create mass involvement by being accessible, comprehensible and flexible.

It should liberate human beings from boring, degrading, excessively heavy, dangerous or unsanitary work.

9.4.5 Environmental development

It should minimize depletion and pollution by using renewable resources, through built-in waste minimization, recycling, and/or re-use and blending with existing Eco-cycles.

It should improve the natural and man-made environment by providing for a higher level of complexity and diversity of the Eco-systems, thereby reducing their vulnerability.

Ch.10. Case studies

10.1 Case study 1

10.1.1 Paper industries-Auroville

Paper based industries

The paper-based industries get their raw materials from garden wastes like dried leaves, banana fiber from the banana leaves, Casuarina, and other wood waste.

The other units use this paper to make various paper products like lampshades, stationery, paper machi, etc.

These products are exported to other countries and in various places in India as well.

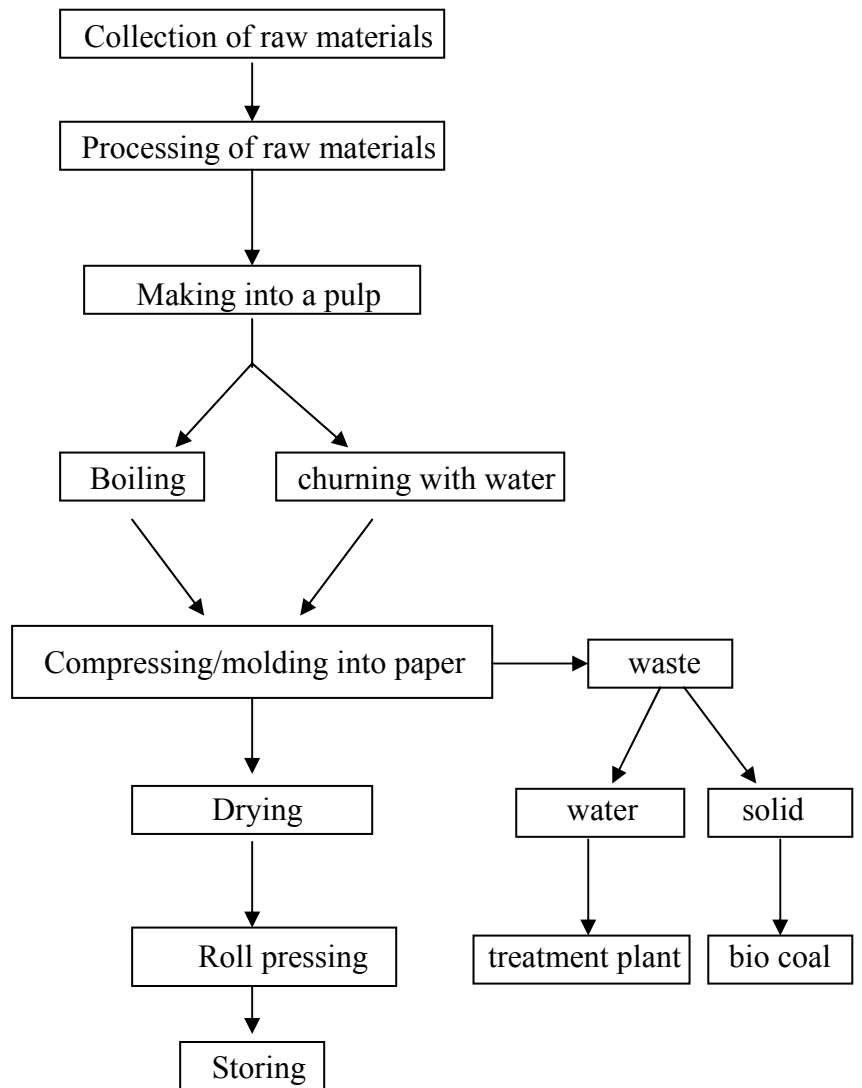
Auroville press-a paper and paper products manufacturing unit. (Total area 700 mt. sq.)

Office area (100 mt. sq.)

Products manufacturing area (100 mt. sq.)

Reception, lobby, entrance foyer, etc. (50 mt. sq.)

10.1.2 Diagrammatic study of different areas with their functions



10.1.3 Areas and their functions

1. Collection of raw materials (25 mt. sq.)

The collection of local raw materials like Casuarina leaves, dried people leaves, banana plant waste, dried flowers, t-shirt cloth, etc. is done in an open or semi open area.

The raw materials are soughed and stored in gunny bags in an open space.

2. Processing of raw materials

- Some raw materials like leaves, flowers, banana plant waste, etc. are boiled in a large vessel in a semi open rain protected shed and strained when cooled to obtain a pulp like consistency.
- For making linen paper cloth is used. Cloth is cut into small pieces and segregated color wise. Different colors of cloth will give its color of paper. This is done in a closed room with huge wall mounted vessels for storing of the cut cloth.

3. Converting into pulp (150 mt. sq.)

- The processed raw materials are then fed into a machine, which churns and mixes them with water.
- A thick watery pulp then is transferred manually by buckets on the compressing machines.
- The compressing machine converts them into paper of the required form and thickness.

4. Drying (100 mt. sq.)

- Different textures are given by various natural dried elements like dried fruits and flowers, ropes, textured leave etc.
- The molded paper is then dried on ropes with clips in a semi-covered area.

5. Finishing (50 mt. sq.)

- The dried paper is then put into a roller press for straitening.
- A cutting machine trims edges of some paper.

6. Storing (100 mt. sq.)

- The paper is stored in a rodent free, fire proof closed store room in organized racks of their own type.

10.1.4 Uses of this handmade paper

- Widely used in stationary products like notebooks, writing pads, office accessories, school stationers, etc.
- Used by unit making paper lampshades.(Aladdin)
- Used for making paper boxes, calendars, dairies, etc.(Papyrus)
- Packaging in bakery and other products.(A.V. bakery)
- Producing greeting cards by another unit.(Shrandhanjali)
- For printing in the press.(A.V. press)
- Donated to village schools.
- Sold as handmade paper in its natural form for its beauty and textures.

10.1.5 Advantages of the handmade paper

- The hand made paper is made from waste products like garden waste, unwanted cloth pieces etc. and not from felling of trees.
- It does not use any detergents or harmful chemicals.
- It uses simple, basic machinery, which consumes optimum power.
- It is an Eco friendly non polluting product which is easily bio degradable.
- The industry produces minimum, recyclable and reusable waste.
- The same product becomes a major raw material for the handicraft industry.
- The product produced here can satisfy the need of many other small units using paper for their products instead of importing it from elsewhere hence making the market local and helping Auroville to become self sufficient.
- It gives employment to the many people in and around Auroville.

10.2 Case study 2

10.2.1 Wood industries-Auroville

Wood base industry

The wood based industries get their raw material from Acacia and other timber within Auroville. It is abundantly available due to planned afforestation programs.

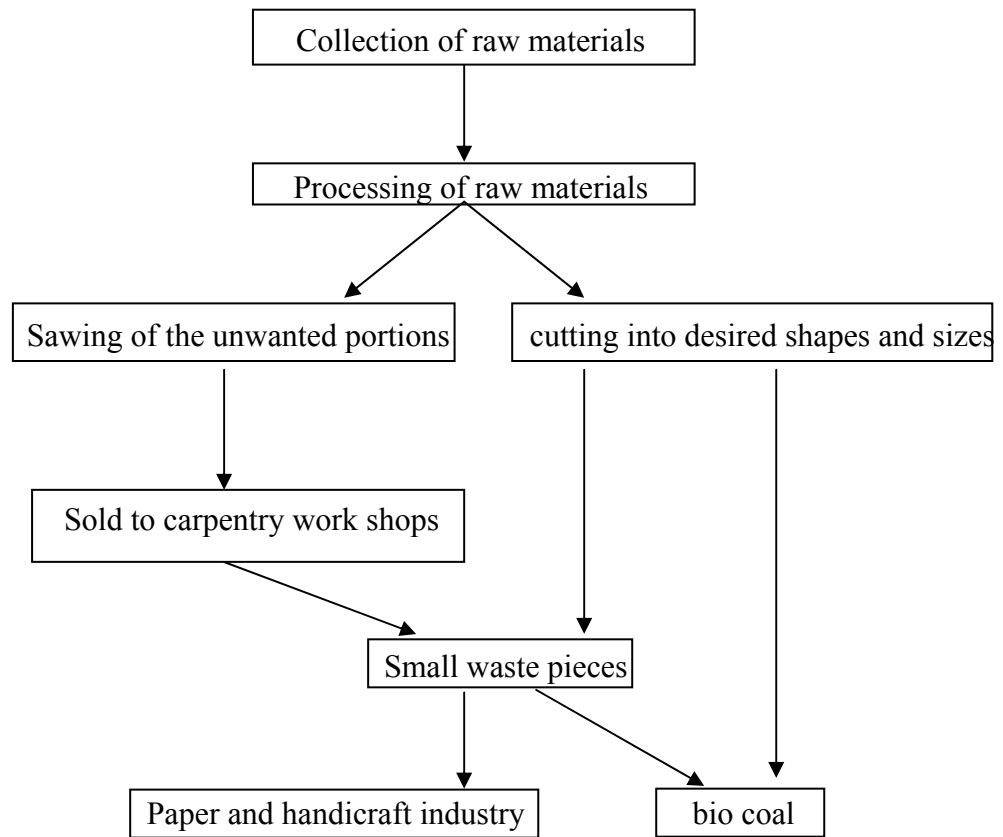
The toy factory has used this wood to produce export quality toys, household accessories, carpentry items, hammock reapers etc. They also get better quality wood from Pondicherry.

Aurorachana and combined general study of small scale saw mills and carpentry units. (Total area 750 mt. sq.)

Office area (100 mt. sq.)

Receptions, lobby, entrance foyer, etc. (50 mt. sq.)

10.2.2 Diagrammatic study of different areas with their functions



10.2.3 Areas and their functions

1. Collection of raw materials-this is mainly done in open and semi open sheds. (200 mt. sq.)

- Wood is brought from broken down old building sites for reusing.
- In form of antique wood (teak) but non-useable furniture and articles for recycling.
- A common and fast growing tree planted in abundance in Auroville – the work trees, which gives good carpentry wood.
- Casuarina trees grown locally.

2. Processing of raw materials (200 mt. sq.)

- The wood obtained from different source is sawed in a sawmill.
- If it is in the form of furniture it is dismantled.
- The bark of the wood logs is removed.
- The logs are cut into various different sizes as per the requirement.
- The wooden battens are then made smooth by sawing the surfaces.

3. Transporting and storing of wood. (200 mt. sq.)

- This wood is transported to the carpentry workshops manually or by the use of handcarts.
- Here the wood is finished more and made into the desired furniture.
- Wood is stored in open but rain protected sheds in form of stacks.

10.2.4 Waste obtained

- The waste obtained in form of shreds and small unusable areas is used for producing bio coal.
- The small pieces not useful for furniture are used in the handicraft industry.
- Some quality of waste is also used in the paper industry.

10.2.5 Uses of wood

- Wood is supplied to carpentry units for making furniture and other articles.(aurorachana)
- Wood is used in making of paper lampshades. (aladin)
- Wood waste is used in paper producing unit.(A.V. press)
- Used in construction works.
- Supplied to other units making small wooden products or using wood for their products. (Shrandhanjali)
- Used in cloth painting units for making screens, hammocks, etc.(lotus)
- Used in handloom units (imagination)
- Used in the handicraft industry.

10.2.6 Advantages of having a wood industry.

- It makes Auroville self sufficient in terms of using wood and its products.
- It becomes a raw material to many industries using wood for their products.
- The wood obtained is generally from local sources and used in recyclable and reusable forms.
- It can satisfy the need in the building and construction of small buildings.
- It is a nonpolluting and biodegradable product.
- It produces very little and useful waste.
- It uses very basic machinery for its processing.

10.3 Case study 3

10.3.1 Cloth industries (handloom)-in Auroville

Garment industry

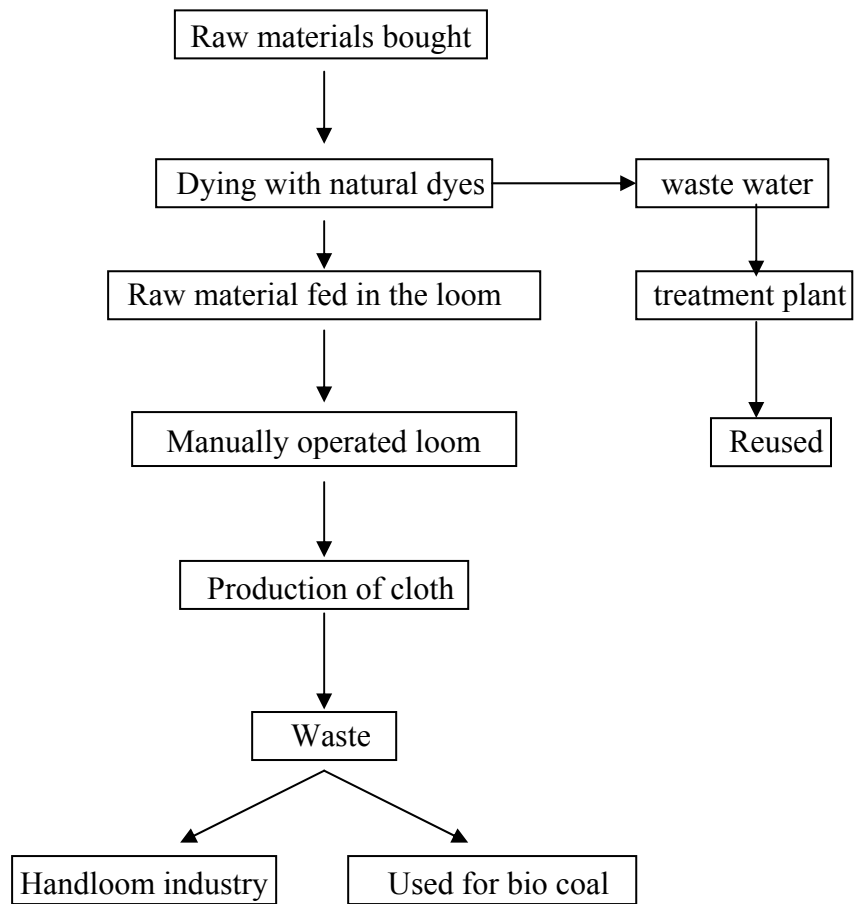
Most of the garment units in Auroville are export oriented and the type of raw material ranges from Cotton to China silk. Some of the raw materials are imported, for example, Auromode, a hand painted and printed garment export oriented unit, import its basic raw material i.e. silk from China and pigments to prepare dyes from Switzerland. Some cotton based garment manufacturing and handloom units get cotton from Madras or Salem and then dye it by organic process in Auroville or Pondicherry.

Imagination-handloom cloth and hammock making unit. (Total area 700 mt. sq.)

Office area (100 mt. sq.)

Receptions, lobby, entrance foyer, etc. (50 mt. sq.)

10.3.2 Diagrammatic study of different areas with their functions



10.3.3 Areas and their functions

1. Raw materials (100 mt. sq.)

- The raw materials are bought in the form of threads from places like Bangalore, Chennai, etc.
- The threads are either already colored but if not they can be dyed using natural dyes to the desired color.
- The storing is generally done in small store like rooms.

2. Weaving (10 mt. sq. area for each machine);(200 mt. sq. total for 10 machines)

- The threads of desired colors are feeded into the handloom machine.
- The weaving machine is manually operated and is generally a single mans job.
- The cloth can be woven to a fixed maximum span but to a required length.
- Different colors of thread can be used for different colors in the cloth.

3. Dying (100 mt. sq.)

- The cloth can be dyed as a finished product using natural dyes.
- The threads can be dyed even before the weaving.
- The thread or cloths need to be dried after washing off the extra dye.

4. Washing (100 mt sq.)

- The cloth is washed and cleaned with Eco friendly detergents after weaving.
- Some times it is even starched it stack in comfortably.
- The cloth is dried in the sun on suspended ropes after squeezing out the water.

5. Storing (50 mt. sq.)

- The cloth is stored in rodent free area in storerooms.

10.3.4 Uses of handloom cloth

- Cloth becomes a basic necessity of man.
- Auroville has much fashion designing units to which this cloth can be supplied. (Upasana, Rangoli, Gecko, etc.)
- Some other units also use small quantity of cloth for making other products.(papyrus, lotus)
- The garments made from this cloth fetch a large market elsewhere.

10.3.5 Advantages of cloth

- Being it a basic necessity it is good to have produced cloth to satisfy the local needs as well as the national and international markets.
- This it becomes an important raw material for all the garment units in Auroville.
- Handloom being a manual machine allows employment to a large no. Of people.
- It does not use any detergents or harmful chemicals.
- It uses simple, basic machinery, which consumes optimum power.
- It is an Eco friendly non-polluting product, which is easily biodegradable.
- The industry produces minimum, recyclable and reusable waste.
- The same product becomes a major raw material for the handicraft industry.

10.4 Conclusions

After studying and analyzing the various industries in Auroville a common observation is made to see that there is a great demand in the market as per the present trend for the handicrafts, of which many products are produced in the various Auroville units. Craft products produced by hand use large amount of human labor hence helping the unemployment problems. Considering handicraft industry as the mother industry for the Eco industrial park, the major supporting industry on the basis of Auroville shall be wood, cloth and paper, as most of the products and wastes of these industries can be directly utilized by the handicraft industry for its products.

Many other units in Auroville manufacture products made out of paper, wood and cloth, which depend on other places for their raw materials. So to help Auroville become self-sufficient it would be beneficial for it to manufacture some products, which serve as raw materials to many others. Hence the selection of the industries is done as per the requirements specific to Auroville.

Ch.11. design project

11.1 area estimation

1 acre = 4840 sq. yards

1 sq.yard = 9 sq. ft.

1 mt.sq. = 10.76 sq. ft.

Therefore 10.76 sq.ft. = 1 mt. sq.

So 9 sq.ft.(= 1 sq. yard) = 0.8364 mt. sq.

Therefore 1 acre = 4048.327 mt. sq.

The present annapoorna site area is 135 acres (Auroville owned land).

11.1.1 Existing industrial areas;

Hand made paper industry	700 sq. mt.
Saw mill and woodwork unit	750 sq. mt.
Power loom and cloth unit	700 sq. mt.

11.1.2 for the E.I.P.

Industrial area

Industries: -

Hand made paper industry	5000 sq. mt.
Saw mill and wood work unit	5000 sq. mt.
Power loom and cloth unit	5000 sq. mt.
Handicraft industry	3000 sq. mt.

Common facilities:-

Waste water treatment plant	500 mt. sq.
Water catchments/harvesting ponds	500 mt. sq.
Solar plant (only battery house)	100 mt. sq.
Windmills	500 mt. sq.
Biocoal plant	300 mt. sq.

Therefore the total area for the industrial part of the EIP will be;

19900 mt. sq. = 5 acres approx. + 0.5 acre (circulation area) =5.5 acres.

Residential area

Residences: -

Type 1

Taking an average area of 225 mt. sq. for a house only at ground level about 10 houses with circulation can be fitted in 1 acre of land.

Type 2

Taking an average area of 125 mt. sq. for a house only at ground level about 25 houses with circulation can be fitted in 1 acre of land.

So let us say that if each of these types of 3 floor low rise buildings each can house about 100 housing units in 2.5 acres of land with circulation.

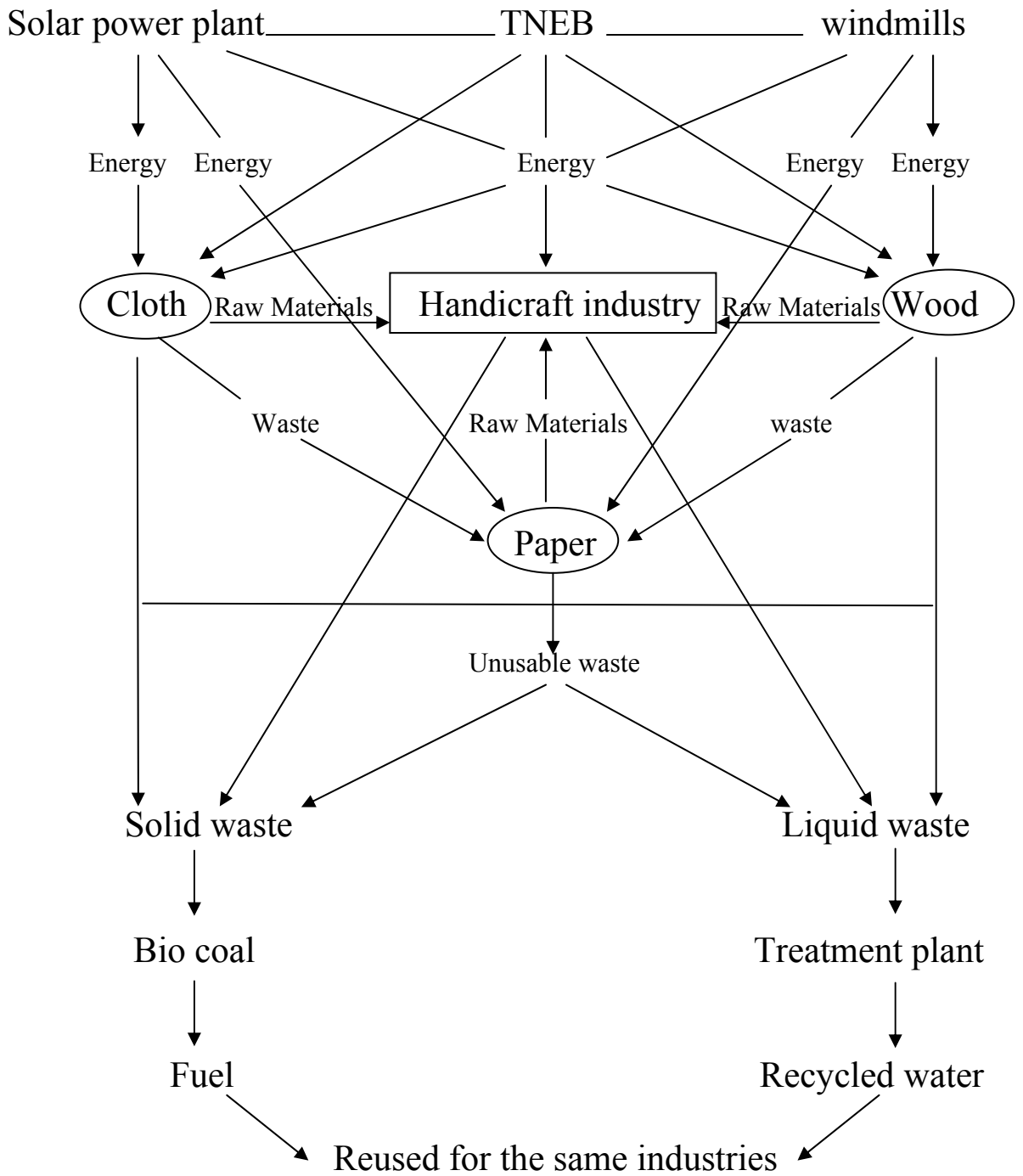
Other amenities:-

Gardens,parks,open squares,playgrounds	1500 mt. sq.
Primary school	1000 mt. sq.
A public building with library, store, etc.	1000 mt. sq.
Common canteen	1500 mt. sq.
Exhibition space	50 mt. sq.

Therefore the total area for the residential part of the EIP will be;
2.5 acres approx. + 1.2 + 0.8 acre (circulation area) = 4.5 acres.

Therefore the total area of the EIP = 5.5 + 4.5 = 10 acres.

11.2 Selection of industries



11.3 Site analysis

11.3.1 Location

The site is located in the outskirts of the main town ship, in the industrial zone of Auroville, Tamilnadu, India.

11.3.2 The access roads to the site

There is one main access from the Tindivanam - Pondicherry state highway; connecting the industrial zone. The same highway connects Auroville to Alankupam village.

However within the site there are temporary gravel and mud roads providing access to the interiors from the highway.

11.3.3 Climate

The climate of Auroville is tropical. The dry season usually lasts seven months, from January to July. May and June are the hottest months with occasional showers. The main rainy season is from October to January.

11.3.4 Temperature

The highest average temperature goes up to 40 degree centigrade in the month of May and June.

The lowest average minimum temperature is 28 degree centigrade in the month of Jan.

11.3.5 Rainfall

Period	months	precipitation in cm.
S-W monsoon	June to Sept.	41.5
N-W monsoon	Oct. to Dec.	75.9
Winter	Jan. to Feb.	1.0
Hot weather	March to May.	4.5

Therefore the total average rainfall through a year is 125 cms.

11.3.6 Sea level

The site is 50 mt. above the sea level.

11.3.7 Wind direction

The wind direction is from South East to NorthWest. The area also falls under cyclonic belt.

11.3.8 Soil conditions

The geological structure of the area reveals that the topsoil is hard laterite on a bed of clay of varying depths. The soil is not sustainable for productive agriculture with traditional methods.

11.3.9 The maximum ground coverage 35%

11.3.10 FAR (floor area ratio)

FAR = (total floor area on all the floors/total site area) x 100

11.3.11 Population distribution

Study indicates the estimated population for the industrial zone is to be 600 for the Phase I and the ultimate population to reach unto 1,800 persons.

Compared to the total estimated population for the entire Auroville Township is to be 15,000 for the Phase I and the ultimate population to reach unto 50,000 persons

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