PUNARCHITH

An Agroecological Greenprint for Angarike Maala

Putanpura village, Chamarajanagar District, Karnataka

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2015

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Overview

A baseline agroecological survey was undertaken for Punarchith Trust in July 2014, of their newly acquired piece of land in Putanpura village off BR Hills Road, Chamarajanagar district, Karnataka. The purpose of the survey and the preparation of a greenprint was to present some of the salient features of the 6+ acres of land, the key challenges facing its rejuvenation, and to suggest a phased approach to revive and restore the land so it could be used as a space to fulfill the vision and activities of Punarchith.

The most critical issue is one of acute water scarcity here. This can be addressed by starting to conserve rain water on the land itself and harvesting rain water from the quarry and roof tops of buildings that may come up. The second is to begin the process of soil building through various ecological methods to create living soil on the land and grow appropriate dryland crops and trees. Survey results indicate that the land may not be able to support a residential campus. A group of 2-4 persons could live there year round. Larger groups may have to visit for the day, and once some water is secured, could come for 2-3 days programmes 2-3 times a year.

This greenprint is not meant to be prescriptive in any way. Rather, it is just a set of guidelines for the trust to consider, adapt and implement as their work and presence in the area unfolds. The approach to the restoration work is presented in three phases – pioneer, intermediate and climax phases. Several activities will of course overlap and continue through all three phases.

It is expected that the people using this document have some basic knowledge/awareness of ecological restoration, agriculture and getting structural features done on the land. The greenprint does not function as a Do-it-Yourself instructional manual although some references and links are provided.

Introduction

Punarchith (PC) is a registered trust with its field office in Nagavalli village, Chamrajnagar District, Karnataka, India.

Objectives of the agency:

To run an integrated, alternative learning programme for rural youth, preferably on a residential campus. Chamarajanagar district was chosen as the area of work, since it has a high indigenous population, with most of the tribal communities being marginalised. It is also one of the most underdeveloped districts of Karnataka state. The trust also works with school students and teachers and proposes to nest appropriate sustainable agriculture and home garden programmes for women and men of the area.

To root their objectives in a deeply experiential way, Punarchith looked for and purchased a 6+ acre patch of agricultural land in the village of Putanpura, about 16 km from Chamarajanagar town. This will develop alongside the work of the trust from its office in Nagavalli village close by. The land was yet to be registered when the survey was undertaken in 2014. As of April 2015, the registration was about to happen any time.

All the courses run by Punarchith focus on centering the individuals from within and also connecting them to their ecological, socio-cultural and political contexts. Sustainable agriculture and ecology will be a very important part of this programme.

Campus description

Overview of land:

After several years of searching, PC trustees and staff finally identified some agricultural land that they were able to buy. Intended as a campus, the land is around 1 km from Putanpura village. It is about 6 acres and 30 guntas (including kharab land) and has been purchased from Mr. Chamraj, a resident of Nagavalli village. The traditional name of the land is Angarike Maala, named after the plant *Dodonea viscosa* which is found growing wild, and is a part of the landscape. Putanpura village is about 16 km from Chamarajanagar and 2.87 km by road from the Punarchith office in Nagavalli on the BR Hills road. It is located outside the buffer zone of the BRT Wildlife Sanctuary/Tiger Reserve. Chamarajanagar itself is the district headquarters, located about 60 km from Mysore.

The legal status of the land was agricultural and has been converted to non-agricultural as per the legal requirements of a trust purchasing the land. The land is solely owned by Punarchith Trust.

The entrance to the land is from the North. The slope hence is in a South to North direction. Geographical coordinates are the following: 11°55'17.30"N and 77° 02'21.74"E.

The land is on a slope. The range of elevation on the land is 712-719 MSL. The upper half consists of scrub and a few stunted trees. There are also two large and two smaller gneiss quarries of varying sizes on the land, that occupy 40% of the land. The upper most quarry is split by ownership into two. It was unclear at the time of the survey who owned the portion of the quarry outside the land. Mr Chamaraj claimed it was government property. This was verified later to be true. The middle strip is flat and has a pump house and an old sericulture unit, all broken down. The lower portion is where agricultural activities were carried out. This occupies 42% of the land and is spread over two terraces. It has some coconut trees in poor health. Wild *Indigofera* plants grow fairly profusely all over these terraces. Silkworm rearing was tried out here by people that Chamaraj had rented the land to, but failed. The tenants burned tyres on the land. There is evidence of this where some portions of the middle terrace are black, and this has also flowed into parts of the agricultural terrace below.

A borewell for water reportedly failed.

Many parts of the land afford a beautiful view of the BR Hills and wildlife sanctuary in the distance.

The campus has been visited by the following people who said the land was viable to begin the programmes that PC intended to do. They also offered advice on various issues. Dr. Prakash Bhat, Balan and U.N. Ravikumar were the people who visited. U.N. Ravikumar will probably be consulted every 3-4 months about the campus if inputs are needed. He is based in Mysuru. Vanastree, a women farmers' collective in Sirsi, Uttara Kannada district in Karnataka, has been associated with Punarchith from the beginning of its work in the district and took on the task of preparing the greenprint.

Agroecological Survey

Aim of the agroecological survey:

To produce a master plan that will help Punarchith understand the new campus land and its surroundings, leading to appropriate decisions, activities and infrastructure in an ecological, sustainable manner. *Decisions about the land have to concur with the overall broad approach to integrated agriculture/ agroecological practices and the local/traditional knowledge base and not contradict it.*

Resource persons:

Sunita Rao, Alex Bouvard and Maeva Colombet (Vanastree interns 2014-'15), U.N. Ravi Kumar, Abhisheka Krishnagopal, Saleem Hameed, Puttu Ranga. We gratefully acknowledge the following for their immense help and cooperation in creating this greenprint – the entire Punarchith team; Dr. Jayadeva, Deenabandhu Trust, Chamarajanagar; Krishi Vigyan Kendra, Chamarajanagar; and U.N. Ravi Kumar, Mysuru.

Approach to the survey and methodology:

The agroecological survey looked at several key aspects like

- Soil
- Water/Drainage/Irrigation management
- Agri-horticulture
- Home garden
- Wildlife and Biodiversity
- Buildings
- Energy
- Social aspects
- Finance

The focus has been on soil and water profiles and attempting to choose appropriate farming methods and species to match this profile. The survey was done by visiting the land often, observing it before and during the monsoons, taking measurements of the quarry, using Google Earth maps, getting a contour map done via a professional agency, and sending soil and water samples for analysis. Detailed discussions were held with the PC staff for their vision of the place (Annexure 8) and with the Vanastree interns who were both students of agronomy with a strong tilt towards agroecology.

The overall approach taken has been to try and *think like a farmer* in the planning and execution of the plans. It is the land and growing/restoration that is primary. The approach should not be that of keeping a museum or something that is static. The process of restoring the land itself would be part of the whole learning. Micro level sustainability has also been kept in mind. This approach was thanks to U N Ravi Kumar and his advice.

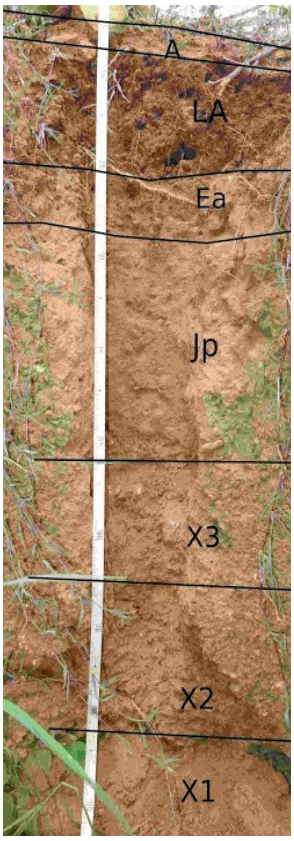
Soil

There is no soil map available for this region. But thanks to observations and tests we defined some characteristics. The parental rock is a metamorphic gneiss including white quartz. The soil is initially an Arenosol up to a depth of 1 to 2m. But after the creation of the agricultural terraces (and particularly the lower one), the soils were really modified with the input of clay from the humid area near the village. So now the soil is an Areno-Anthroposoil (See Figure 1).

The soil is badly eroded and not really living. Human activities and high erosion (rain, wind and heat) have had a huge negative impact on the soil. Nutrients, clay and minerals from the break-down of rocks have been washed away from the land by rains, since there are no retaining or preventive features to hold back this process.

The structure seems to be granulose with rounded and soft aggregates. This is a good sign because the porosity can allow the circulation of air and water in the soil. Furthermore, the development of roots and biological activity is easier. The soil also contains some stones.

The texture of the soil, a parameter that one cannot improve or modify without the addition of other soil, is definitely sandy. Only about ten percent of both clay and loam are estimated and more or less eighty percent is sand. The very low level of clay explains the granulose structure of the soil, but it also causes a problem in the retention of water. Indeed, the clay particles are very small in size (<2µm) so they can stock the water very well. However, in sandy soil, the capillary phenomenon is almost nonexistent that makes the management of water in the soil more difficult.



A = Organo-mineral horizon

LA = Ploughed horizon

Ea = Alluvial horizon

Jp = Young and deep horizon

X = Peyrique and stony horizons

Figure 1: Soil Profile with different horizons

Soil samples from 6 different areas on the campus across the agricultural terraces and the third step (since potentially the home gardens will come up here) were sent for analysis to the KVK Lab (See Figures 2 and 3).

Figure 2: Location of soil samples on the campus

Figure 3: Photo of the collected soil samples

The pH of the soil ranges from 7.17 – 8.25. Five out of six samples have a pH of less than 8 indicating that the soil is very slightly basic, but tending towards neutral. pH over 7 is common in the areas of low rainfall.

The electronic conductivity expresses the quantity of dissolved mineral salts in the solution of the soil. The values obtained with the samples are very low (between 0.088 dS/m and 0.123 dS/m) compared to the normal average electronic conductivity of about 0.5 dS/m. This means the quantities of minerals easily solved such as nitrites (NO3-), sulfate, chlorides, bicarbonates (HCO3-) are very low in the soil.

The rate of organic carbon was studied in the 6 samples. Not surprisingly, the results show that the soil is very poor in organic matter: the values range between 0.41 and 0.62% of organic matter. The usual rates of organic matter in the soil are from 2 to 5%.

Nitrogen is considered as the most important macro-nutrient because it is the essential constituent of proteins, which plants need to synthesize chlorophyll responsible for plant growth. The values of nitrogen in the soil range from 88 kg/ha to 163 kg/ha, which is relatively low. However, just one value is under 100 kg/ha.

Phosphorus is the element needed for flowering, rooting and fruiting. The values obtained with the analysis characterize a soil very poor in phosphorus: from 15kg/ha to 21 kg/ha. A usual good soil contains between 100 and 200 kg/ha of phosphorus.

Potash is critical for plant vigor as it regulates metabolism. The values observed in the samples range from 150 to 188 kg/ha. These values are a little low but tend to the average of 200 kg/ha for a medium soil. For a detailed soil description and analysis please refer Annexure 3.

No analysis was done of pesticide residues and CEC (Cation Exchange Capacity). CEC ranges from 0 to 100 percent of cation saturation, with 100 representing a capacity of pure humus. The higher this number, the greater the soil's ability to hold on to cation elements so they can be released for later use. For example, cations will easily leach out of sandy soil which has a very low CEC. Typically, you will always want to increase CEC.

A good soil will have an organo-mineral complex consisting of humus, clay, sand, loam and biota (bacteria, fungi, etc). CEC, pH and organic matter are the most important parameters we need to look at while doing any agroecological soil profile.

Reccommendations:

1. Minimize loss of nutrients and clay by building bunds in the catchment area, natural fences along the border and in between terraces. The key is to keep the clay in the soil.

2. Organic matter has to be increased to build a robust organic mineral complex and increase CEC of the soil and retain more nutrients. This can be done by adding biomass generated on the land (leaves, branches etc). The roots of the plants will also create biomass in the soil. **We have to begin the mechanism of building the soil and retaining carbon in the soil.**

3. Multi species nitrogen fixing plants to be grown and leaves put back on the soil as green manure and mulch.

4. As the soil contains very few small particles, the fixation of organic matter is disturbed. That is why the inputs of organic matter have to be very frequent and regular.

5. When we are sure we can retain nutrients in the soil (as shown by periodic CEC analysis), then we can consider getting several cart loads of FYM from Putanpura.

6. It is hoped that with bunds and addition of organic matter the clay element will grow.

7. Get CEC analyzed. This will help as baseline information and for comparison later on.

8. Use of soil profile area done in July 2014 to monitor the evolution of soil profile. It is expected that with the right interventions and inputs the soil profile will change to have more clay, organic matter etc

Figure 4: Photo of the coconut fields (July 2014)

Water/Drainage/Irrigation management

Average rainfall for Chamarajanagar district is 700mm. There is no rainfall map available for the different towns or even at a taluk level. Local farmers say that the proposed campus was cultivated in earlier years and yielded rich harvests. Bunds used to conserve rainwater, and even crops like ground nut were grown. A borewell was constructed but stopped yielding water some years ago. No attempt was made by Chamaraj to recharge the borewell. Putanpura village itself has an old, stone lined well which is about 40 ft deep. The well used to supply the villagers with water but ran dry too with more and more borewells coming up in the area, and extraction exceeding recharge.

There has been a dramatic increase in the number of borewells going upto 650 and more ft. Close to the Punarchith campus, one of the farmers said his own bore was at 650 ft and another farmer had not struck water even at 1000ft. Given this situation, and the fact that the water from the neighbouring borewell was suitable for agriculture, water rain fed irrigation and rainwater harvesting may be the most viable options to invest in.

An analysis of the water of the neighbour's borewell was done to have an idea of the quality of the groundwater in case there would be a possibility to use it. The sample was sent to the KVK Lab.

The pH is slightly basic (8.02) but in the normal range (6.5-8.4). The electric conductivity is medium (0.911dS/m) within the average value range (0.7-3.0 dS/m). The chlorides are not in excess (1.72 me/L) since their value is below the critical value of 4 me/L. There is no carbonate and the bicarbonates (4.89 me/L) are slightly high but still within the average values (0-10 me/L).

The results of this analysis show us that this water is medium tending to good in quality so totally adapted for agricultural uses. No cropping problems or reduced yields should be expected because of the water quality of the groundwater. For a detailed water analysis please refer Annexure 4.

Figure 5: Photo of the largest quarry in the monsoon (July 2014)

Recommendation:

1. If the two upper quarries are covered with a three-tiered roof, a significant quantity of water can be harvested. The surface that can be covered in the big quarry is 18m x 28m (504m²) and the smaller one next to it covers 14m x 14.5m (203m²). So about 700m² of surface is potentially available to harvest the rain. Since the average rainfall is 70 cm per year, the roofs can save 490m^3 (490,000 liters) of water per year! The small quarry could be used as a storage tank well integrated in the landscape if built (with the stone available on site) in order to close it. It could contain about 800m^3 of water (14m x 14.5m x 4m) so is big enough for the water collected during one year by the roofs of the two quarries. With 490,000L collected each year, 3.9L of water per sq ft will be available for the entire surface of the agricultural terraces, or 17.7L per sq ft if just used on the cultivated squares (please refer section on agri-horticulture).

2. The roofs of future buildings should also have rainwater harvesting structures built in. This water could be stored in smaller drums or tanks near each building.

3. Gravity can be optimised to transport the water thus saving on the need for pumps.

4. Water loss due to evaporation and run-off from the land can be minimized by diverting it to stay on the land to get stocked in tanks or the soil. Or to be used by vegetation. Windbreakers (trees) will also prevent water loss by evaporation (see Figure 6 for location of windbreakers). Sun and wind cause evaporation of water – crucial to keep water in the fields. The fences can be pruned when sunlight is needed for crops, particularly during the monsoon. See Annexure 5 for the possible tree species that can be used as windbreakers. With trees and shade, temperature comes down, and hence with less water loss, humidity increases.

Figure 6: Location of windbreakers on the campus

5. Bunds have to be built to contain the water flow during the monsoon. Along the slope, bunds can be made with coconut husk and stone imitating the shape and layout of fish scales, in order to level the ground like small terraces to slow down the water flow. In this way, the water could enter into the soil rather than flowing along the slope on the surface and out of the land.

6. Using contour lines (see Figure 7), you can also build swales to stop the water. They can be from one to several feet across (depending of the slope), a foot or so deep, and whatever length necessary. The earth dug from the swale is piled on the downhill side to make a berm (a cross section of the swale looks like the letter S on its side). It will be more stable if the berm is planted with shrubs (Vetiver grass *Lavanchya)* or trees. You can also fill the swale with mulch to help absorb more water. The steps between the terraces could follow this model (see Figure 8)

Figure 7: Location of the covered quarries (blue) and contour lines (red)

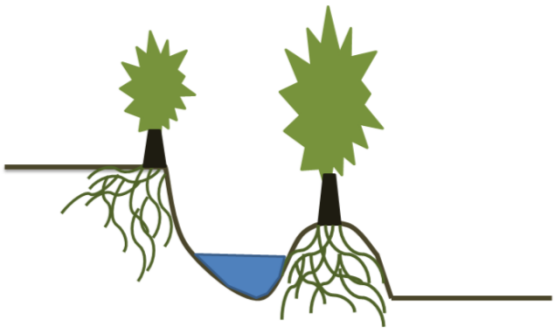


Figure 8: Model of swales to stop the water between the different terraces

7. The water holding ability or capacity of the soil has to be increased. This retention can be increased by building soil. Please see earlier section on soil building. Water is currently being drained away since the present soil is more like a drainpipe. There is great potential though for the land itself to be made into the biggest and best water storage tank on the land. This is a crucial objective that one needs to work for.

8. Rainfed irrigation is appropriate for the agricultural plots and for the upper part of the catchment where native flora will be allowed to regenerate. Biofences will be rain fed. Use of drought tolerant crops and plants can be used for the agri-horticultural terraces. Please see list of crops and trees in the section below that can be used. No water intensive agriculture is to be practiced on the land.

9. As we have seen in the preceding section, the structure of the soil hardly holds or retains water for absorption by plants. The easily utilizable reservoir in the soil is very low, so the best way to provide water to the plant is to fractionate the irrigation (frequent inputs of small volumes of water).

10. If there is enough water in the canal of the northern part of the land either by release of water from the Suvarnavathi River, or by creating storage basins in the canal itself, this could be pumped up into the fields. Drip irrigation is preferable to sprinklers which allow too much evaporation before the water reaches the plants.

11. Securing water for human consumption on the land is a high priority. Both borewell water from the neighbour's and any rainwater that is harvested is to be sent for analysis to make sure it is fit for human consumption. Appropriate roofing material for rainwater harvesting has to be chosen. Storage tanks have be secure and well made to avoid contamination.

12. Collecting and re-using greywater is also very important. Even if the water consumption is the bare minimum, one still uses water for hand washing, bathing, cooking, dish washing etc. All the water should be collected using a system of pipes installed during the building construction. It can be stored in a separate tank outside the buildings, but the water should not stay for a long time to avoid contamination by bacteria and unpleasant smells. Grey water should be applied only to base of the plants and not the leaves, even if only organic (or eco-friendly) soaps and other cleaning agents are used.

13. Measurement and maintaining of rainfall data with a rain gauge is essential to build up a pattern. The model could be similar to the one set up at the PC office in Nagavalli with protection for the bottle against sun.

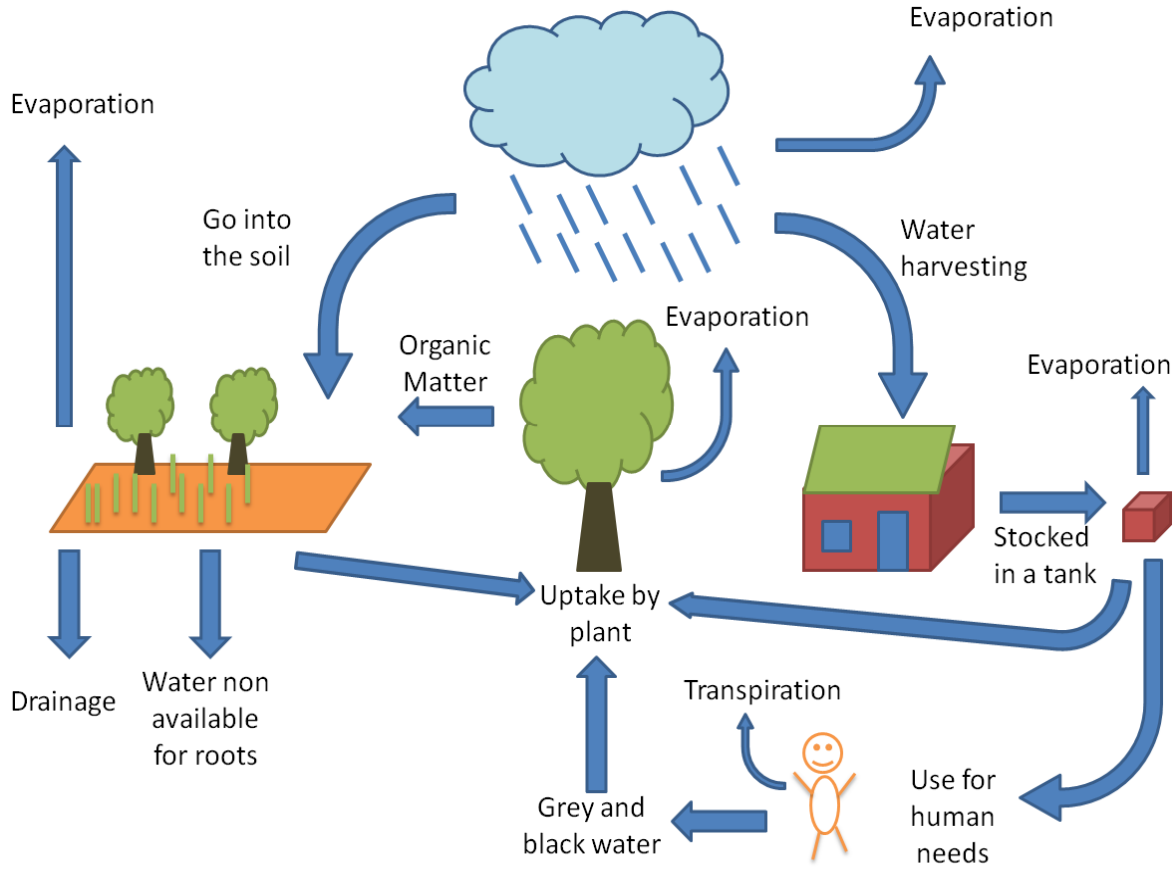


Figure 7: Simplified cycle of water in the campus

Agri-horticultural plan

The focus for all agriculture and horticulture needs to be on an integrated farming approach. The overall approach should look at the water-energy-food connection and plans accordingly made. Please refer Annexure 5 for the crops and cropping patterns that are suitable for the area's geography and environment. This is suggestive, and more information and the finer nuances of what is to be done will come up when the actual field work is taken up. *KR Dattye's Banking on Biomass (CEE, Ahmedabad)* is a book relevant for the planning of the campus.

General agricultural recommendations:

1. Incorporate compost or organic material in the soil. The compost can be made from organic and vegetable wastes. Grass, leaves, prunings from trees and bio-fences, straw, bagasse, manure, and all kinds of organic matter must be incorporated into the soil to improve the fertility and the water capacity retention.

2. A good practice would be mixed cropping with grains and pulses. The pulse allows an improvement of the fertility by making nitrogen available for the other crops. The straw of the grain provides organic matter (carbon). Both are very important to optimize the C/N ratio of you soil.

3. Choose short term crops to limit the risk of climatic accident and water dependence.

4. Use the straw of the harvested crops as mulch and apply them directly on the surface of the field.

5. Never leave the soil naked. Use a cover crop (see the list below) or at least a mulch to prevent soil erosion, weeds invasion, evaporation and soil dessication (drying).

6. Cover the soil around plants with a mulch of straw, leaves or cut grass.

7. Provide young plants with shade to keep them cool.

8. Remove weeds because they compete with the plants' moisture intake. Use them as mulch to cover the soil.

The land can be divided into different zones. Zone 1 refers to the two terraces with the coconut trees. This may be used for crop production and inter-cropping. Zone 2 is the portion on the eastern side of the second agricultural terrace with no coconuts. This may be divided into squares. Each square will be a composite whole to try out sustainable agri-horticulture and will units for the Integrated Learning Programme (ILP) students and other learners. The third zone could contain a plant nursery (wild and cultivated), seed production place and mother beds with a living trellis. Finally the Zone 4 could be a drying area or even a playground (see Figure 8).

Figure 8: Location of different zones in the campus

Suggested planting practice for the field (Zone 1): Guli Vidhana in Ragi

1. Ragi seeds are initially raised in the seedbed. Traditional varieties are the most suited for this method. In order to prepare the seedbed, plough the bed and pass the harrow to level the land, remove the weeds and bring the soil to fine tilth. If the bed is still having clods pass the Koradu (wooden plank). Cover the bed with a mulch.

2. During germination, prepare your land by ploughing it in both directions between the coconut trees to form the pits. The distance between two rows must be 1 feet. At the intersection, pits are formed. 10 days later, incorporate manure to the prepared soil. Before transplanting, apply a handful of manure into the pits.

3. In each pit, transplant two saplings of 20-25 days old. Care must be taken not to plant more than 30 days old saplings.

4. *Mixed cropping*: Sow the seeds like horse gram, cowpea and sorghum as mixed crops after 15 days of transplantation of ragi saplings. However, if sown as a cash crop, horsegram can be sown 60-70 days after ragi transplanting between two rows of ragi. If seeds for inter crop are sown simultaneously at the time of transplantation, inter crop ratio of ragi to other crops should be 6:1 by seed weight. In this case, Yadekunte and Koradu must be ploughed in only one direction.

Suggested mixed crop planting practice for the squares (Zone 2):

The average size of the square could be 50 ft x 50 ft, so 8 squares can be made in the second terrace. To avoid evaporation and wind damage, trees can be planted 12 feet apart. In between these trees, pineapples, chilies and tubers can be grown in trenches. Then in the middle of the square, you can mix crops like millets, oil seeds and pulses (see Figure 9). Circular planting may also be tried. This zone lends itself to experimentation to see what techniques and practices really work. Indeed, this area may be one where a package of best practices may evolve.

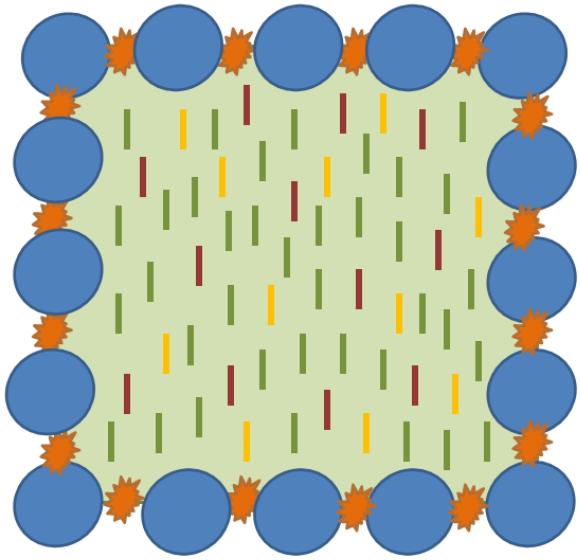


Figure 9: Example of square with fruit trees (blue), pineapple, chilies of tubers (orange) and multicrops.

Plan for installation of a nursery / seed production place / mother beds with living trellis (Zone 3):

Sowing seeds/tubers in mother beds for the crops, nursery for trees and other plants or even seed production can take place in the zone 3 because of the small size adapted for this kind of occupation, the protection by the fence on the Eastern side and the quality of the soil. This activity will also be closer to the future buildings and residential units and will be easier to take care of since they will a lot of close attention.

In order to maintain parts of this area under partial shade, a living trellis can be installed. Indeed, with a support made with local wood, you can plant climbers at the base of each pillar. Vegetables such as gourds, cucumbers or beans can be well adapted for the trellis.

Home Garden

A home garden, as the name suggests, is in companionship with an attached home. The tending of it is different from an agricultural plot. The home garden lends itself to growing a diversity of crops and other allied activities. It is a rather intimate space providing manifold benefits to the family it is tended by. It would be ideal if small home gardens came up on the land attached to any future residential units. Although there would be an overlap of many of the plants grown and the methods, the home garden will differ in that it is very small scale, highly diverse and will serve to provide for the person(s) living in the home it is attached to. Irrigation should be through recycled grey water and rain water.

A variety of vegetables, fruit trees, medicinal and other plants can be grown. Amaranth (haruvay soppu), variety of beans, ladies finger, brinjal, cucumber, pumpkins, other squashes and gourds, aromatic herbs like pudina (mint) and coriander (kothambari), tubers etc are some of the vegetables that can be grown. In places where the kitchen and bath water drains, coconut, banana and papaya may be planted. Care should be taken to see that no toxic cleaning agents are used by the residents so the grey water is safe to use. Wild plants like *garkesoppu* can also be harvested and eaten. Bee-keeping can be tried out. Poultry can also be kept.

The home gardens will have to be planned according to the wind and sun-shade regime. They can be used as learning spaces for PC's food garden courses. In time, a larger space could be set aside to serve as a seed production unit along with a nursery and a small exhibition to showcase the importance of home gardens. Please see Annexure 6 for a preliminary list of potential home garden species for the PC land.

Wildlife and Biodiversity

It is obvious that the land hosts a variety of wildlife (both flora and fauna). This is based on the survey done by Abhisheka Krishnagopal and Saleem Hamid, the overnight trip by Alex, Naveen and Vinod, and regular observations. Puttu Ranga, a Soliga very knowledgeable about flora also visited the campus and rapidly identified the wild plants there. A pictorial guide was built up which he promised to help complete with the names attached to the photos. However, he has since not been reachable and the document remains to be completed.

The upper portion of the land which is the catchment is to be left to regenerate. Native flora can be planted there, and the place could thrive as a micro wildlife refuge. The presence of the quarry could also act as an extra space for wildlife (birds and aquatic species) especially during the monsoon when the bottom becomes a pool. Please refer Annexure 7 for a list of flora and fauna recorded thus far. While the entire campus can host wild species and be a tiny biodiversity reserve, this upper portion should especially be restored as a space strictly for wildlife. It would make a very important outdoor classroom for PC's courses and serve as a model that agricultural operations can be carried out along with consideration for other creatures, while also being aware of the ecological services performed by such wilderness spaces however small.

Buildings

The flat patch of land having the current pump house seems the most ideal for the construction of buildings. It is beyond the scope of the greenprint to get into the details of the buildings. It is best that PC consults with an architect sensitive to the vernacular and passive forms of architecture and evolves a master plan with a layout for the proposed buildings and the interconnected spaces. This will have to be reviewed by PC a year or two down the road. The buildings will have to be designed in a way where they interact with one another, yet also have their separate identities.

In a fully fledged campus, the buildings would include an office to serve as a reception area, a library, a large classroom or two, a workshop, home for the caretaker, storage room for tools and produce, dorm for about 20 students, and a couple of residences for any of the PC staff or their guests. Home gardens, public gardens or green areas and outdoor meeting spaces will also be incorporated into this and the buildings will merge and flow with the designed landscape. Visitors coming for camps, short term visits or for other workshops may stay in the dorms or in tents at specified points. There needs to be as little wastage of space as possible and multi purpose use of space is encouraged. If the land is only to serve as a restoration project, with student groups visiting for the day, then the planning needs to be done differently.

Building material needs to be as local as possible. There is ample stone on campus that can be used after ascertaining the legal procedures. Old bricks are also available. Bamboo, mud, wood, stone, terracotta are some of the materials that can be used with simple, yet functional aesthetics in mind. Old wooden pillars and other building material can be sourced from Putanpura or Nagavalli. Nagavalli has some fine examples of house constructions and these may be looked at to keep the vernacular architecture in mind while designing. The traditional stone workers, carpenters, and masons can also be identified. Their wisdom and skills would be essential and invaluable in creating the living spaces on the land. The PC team also needs to be fully involved in both the conception of the buildings and associated spaces, as also with the actual work when it happens.

Since the climate here is hot and dry, emphasis will have to be on keeping the dwelling units cool. The roof can be of thatch, terracotta tiles, or later even a mud/lime/brick dome or prefabricated jack arch roof. While passive lighting and good ventilation are important, it is crucial to keep the place well insulated to it stays cool without the use of a fan. Roof water harvesting must be an important consideration in any construction work.

For starters, the old pump house can lend itself to being redone creatively and converted into a living (sleeping, cooking, bath) and storage space along with an attached veranda that is covered with thatch and available for visiting groups or even for the staff to rest or have meetings. If the pump house is dismantled and redone, its new location will have to be in keeping with the master plan.

The two large quarries will make excellent multi-purpose spaces if worked on. The larger quarry can be a classroom, workshop, dorm or amphitheater. If covered with a tiered roof, it can also function as a rain water harvesting structure with the second, lower quarry being considered for storage. Although the roof expenses and cost of the stone work to make the quarry into a usable

space will have to be calculated, it must be borne in mind, that the expense will take care of water needs to a large extent and will also provide a large usable space.

Regarding sanitation, one may begin with pit loos. Later on, bio-toilets can be made. As far as possible, it is ideal to have dry toilets, with water provided for washing. All bath and kitchen water must be recycled in the garden.

Energy

Since power cuts are very common in the area, and extend over large periods of time (as of April 2015 there is no power from 9 am to 6 pm), other sources of energy will have to be considered. Energy is mainly needed for heating (cooking, bathing), lighting, cooling and water lifting (pumps). The campus needs to try and be as independent and self sufficient as possible. Options for renewable energy include solar and wind.

The essence of the energy issue should be prudence in the use of electricity or any energy, use of passive energy like gravity to get water to all parts of the campus, natural lighting and cooling, biomass based cooking fuel (or gas) and “Mitti Cool” terracotta cooling units instead of fridges. There is plenty of sunlight and this can be employed for cooking with solar cookers, to dry grain, clothes etc.

There are several individuals and agencies in Mysuru and Bengaluru who would be able to give advice on the best possible renewable energy options including biogas. It is important to bear in mind the overall energy security and insurance of the land (Ravi Kumar, pers. Comm).

Social aspects

The campus is intended to serve as a small scale restoration site where the local community and people from outside can drop in, share ideas, learn from the experiments and also be inspired to see traditional and new ways in which very serious problems related to both agriculture and society can be tackled. So, the land is intended to be an interactive social space where a lot of cross pollination of ideas and action takes place. This will be one of the key functions of the place.

PC already has a very good standing in the area and maintains cordial relations with the various communities and caste groups of the villages in and around Nagavalli. This will be a strong driver to carry forward the vision of PC. It will also be one of the most challenging aspects. While the other goals are relatively straight forward and tangible, the social dimension and science is an area where the group needs to tread carefully. Fortunately since there are sensitive, experienced, trained social scientists in PC this will be well thought out and careful, effective steps taken to make the land a space where social change, peace and a wholesome ecology can grow and ripple out.

This said, it can only be hoped that the land will really evolve into an integral part of the area's social landscape given that the place has such a rich history, and there is so much change happening all around currently, a lot of which is really detrimental and negative to for the long term sustenance of the area and its people.

Finance

Land and its development can soak up a lot of resources and become a capital intensive venture. It would be prudent to create a fiscal plan for Angarike Maala from the start, taking into account all the inputs needed. This has to be followed up with maintaining a cash-flow statement with regular reviews. Initial material costs, labour, recurring costs of maintenance have to be accounted for. Ideally, if all the food could be consumed by the students it would be good. Or sold locally. Ideally if the planning is such that in time the land is not a financial drain and maintains itself from income accrued by self consumption, sales or any services that the place may render (venue for camps, workshops etc.). Sales may have a positive effect on the local farmers who could otherwise view the exercise as something an NGO is doing since it has the resource, and dispel the notion that civil society groups do not have to worry about finances. While it is important to use cost effective means to develop the campus, it is also equally important not to be penny wise and pound foolish, and be trapped by constant repairs and maintenance due to sub standard materials and poor execution.

Self-supported volunteers and interns could cut down land development costs both in terms of actual physical labour and skills, and inputs for designs and good practices. This is something that the group may wish to consider.

Restoration Plan in phases

Phase 1: early/pioneer phase

Phase 2: mid/intermediate phase

Phase 3: long term/climax phase

PHASE 1

The following steps are suggested as part of Phase 1 of a practical plan for the first year or two based on U.N Ravi Kumar and Lalitha's visit to the PC land on July 29, 2014. It is assumed that the land would be registered and all the legal procedures completed before taking up the steps outlined.

1. Get a **government survey done and mark out boundaries** of the land. Since the Southern part is a bit vague, and currently only half the quarry officially belongs to the land, it is important to see if the remaining kharab land of 16 guntas and 6 guntas respectively also are included in the land and can be fenced in. If the entire quarry can be fenced in, it will be optimal. Mark **photo points** from where regular photos (thrice a year at the same time each year) are taken to keep a visual record of the land.
2. **Financial outlay** for the next two years on an annual and monthly basis. PC needs to be aware of its budget for the land and operate within that limit. Hence all the activities will have to be prioritized accordingly.
3. **Securing water** is a big priority. For starters, an arrangement (with a monthly contribution) to get water from the neighbour can be explored – maybe 1,000 l per day for domestic and agricultural purposes.
4. **Electricity connection** will have to be transferred from Chamraj to PC.
5. **Fencing** the land with barbed wire, with gates at appropriate places – entrance, south and east. Live fencing once the rains begin, to be done with Gliricidia, Agave (Kathale), Kadu hunase (*Pithecellobium dulce*), Mulberry (*Morus alba*), Erythrina, Neem, Agase *(Sesbania grandiflora),* bamboo and other species. Maybe 2000 cuttings of Gliricidia would be needed for the land. A double layer can be planted to generate more biomass. The perimeter of the land is about 700m. Accordingly, the fencing poles and barbed wire will have to be purchased. A rough estimate is that 231 poles and about 11,875 feet of barbed wire for a 3 line fencing with cross wires will be needed. Gates can be made of bamboo or other natural material.
6. **Agricultural activities** with pre-rain preparations. Division of terraces into students plots, ploughing with oxen (since the land has not been tilled for years and has very poor organic content and is not friable), and planting with fruit trees, horsegram and other lentils, millets, oil crops etc. Biomass or farmyard manure to be sourced and added to the soil. Soil can also be gathered from the quarry bottom to spread in the field.Trees to be planted as

windbreakers to the North as there is a lot of wind in the area. These can also be planted across the bunds separating the different terraces - high, intermediate and low. And in rows within each of the agricultural terraces also. Focus on the edge of the terraces where water can be concentrated and strip cultivation attempted.

7. **Tree nursery** to be started in Nagavalli to keep Angarike Maala supplied with saplings.

8. Identifying a suitable architect and getting a **master plan of proposed buildings** on the land. This will allow phased planning and building of structures, planting of trees, planning of gardens, public spaces etc.

9. **Dismantling existing Pump house** and building a new living/storage unit as outlined under «Buildings». The existing and newly sourced materials may be used to build a new structure at an appropriate spot that fits with the master plan. The unit will need to function at a living and storage space (for tools etc), with an attached verandah to the side and front. Mahesh the neigbour has said he can weave thatch from coconut fronds that can be placed over the roof to keep the place cool. Stone can be sourced from the quarry.

10. **Roof water harvesting** will have to be built in as part of the plan. Water can be stored in a tank (Sintex or cement). ALL water should be recycled. Not a drop should be wasted.

11. The new unit can function as a core area and if need be have a fence around the garden of say quarter of an acre or so where a nursery, food garden and trees can be planted, with a thorn fence. A nursery can be set up along with a composting unit. Many of the common home garden species like pumpkin, beans, tubers, trees like sitaphal, lemon, Agase (*Sesbania grandiflora)*, curry leaf, drum stick, pomegranate, guava, banana, etc can be planted. Drip irrigation could be used for the garden - a drum kit with 4 drip lines could be set up. The approach could be to radiate out slowly starting with the living area intensely and then radiating out. The timing of this decision will also be taken by PC since they have other ongoing programmes with which the staff is very busy.

12. **Quarry and upper area is the key catchment area** since it is elevated and on a slope. Structures using boulders on the land to be built - shallow trenches and bunds. This is to divert the water so it flows into the land rather than away, is given a chance to percolate down and be stored in the soil. Use minimum labour and do not move around too much material. Coconut husk may be a good material for bunding and swales. This work will continue through all the phases since its a huge task.

13. **Build ponds and small storage basins** for water to percolate (have to check the soil type and depth before locating these). If possible, try to locate where a storage tank with a lid can be for later use.

14. The **canal** at the bottom of the land running along the northern border could also be used to store and harvest water by building small bunds along its length.

15. The small quarry on the right hand side of the road coming up and at the same level as the terrace where the pump house is can be slowly filled up to make it level with the rest of the land. It can also be used to divert water into.

16. The parts of the road eroded can be filled in and the water course causing this diverted so the water flows elsewhere and is absorbed by the soil. Repair of the **internal entrance road**

to be taken up since the sides are giving way due to the neighbour to the west gouging out the rocks and earth to sell for road construction. Pitching of the sides using the existing boulders advised to prevent road from collapse. This will cost a considerable amount, and PC has to decide how they will tackle the expenses since the land was not in this state when they first agreed to buy it.

17. Review of bore well can be done at the end of the year when the water situation will be clear as also how PC would like to and can use the land. It is advised that no new bore well be dug, since the soil is very sandy and water will not stay. It is better to focus on rain-fed agriculture and roof water harvesting.
18. Paint from the rocks has to be cleaned with thinner or turpentine.
19. **Cation Exchange Capacity (CEC) analysis** to be done as early as possible. This will be the baseline for subsequent annual analysis. It would be ideal to keep the same sampling spots for all soil analysis year after year.
20. Last, but most importantly, volunteers and others who can help with this can come in regularly, since the above need a lot of labour inputs.

Phase 2

1. Review of phase 1 activities and evaluating success and what has worked.
2. Further planting of trees and improvement of nursery
3. Further agricultural work as per plan outlined and any new ideas.
4. Decision on having a couple or some persons living permanently on the land to tend it.
5. Shaping of quarry into usable space (classroom, workshop etc)with skilled stone workers
6. Use of canal along Northern border
7. Review of plan to have tiered roofs over quarries to harvest rain water.
8. Review of water storage tank (quarry or other)
9. Further land work with swales and bunds
10. Developing home garden, nursery, mother beds and seed production areas if someone lives on the land
11. Consumption of produce and sales??

Phase 3

1. Review of phase 2

2. Intense horticulture and agriculture
3. Creating more biomass to add back to the soil
4. Review of whether to add one more building or not depending on usage of the land
5. Tiered roof over quarry after reviewing how agriculture is doing, how much water there is and what is needed for activities
6. Increase in shade and biomass
7. Review of how much food is being produced and the changes.
8. Increase in using the land as a classroom, visits by local villagers etc
9. Overall evaluation of the land as per the indicators outlined below.

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IMPORTANT

Indicators to continue evaluating the campus (provided by Alex and to be expanded by him)

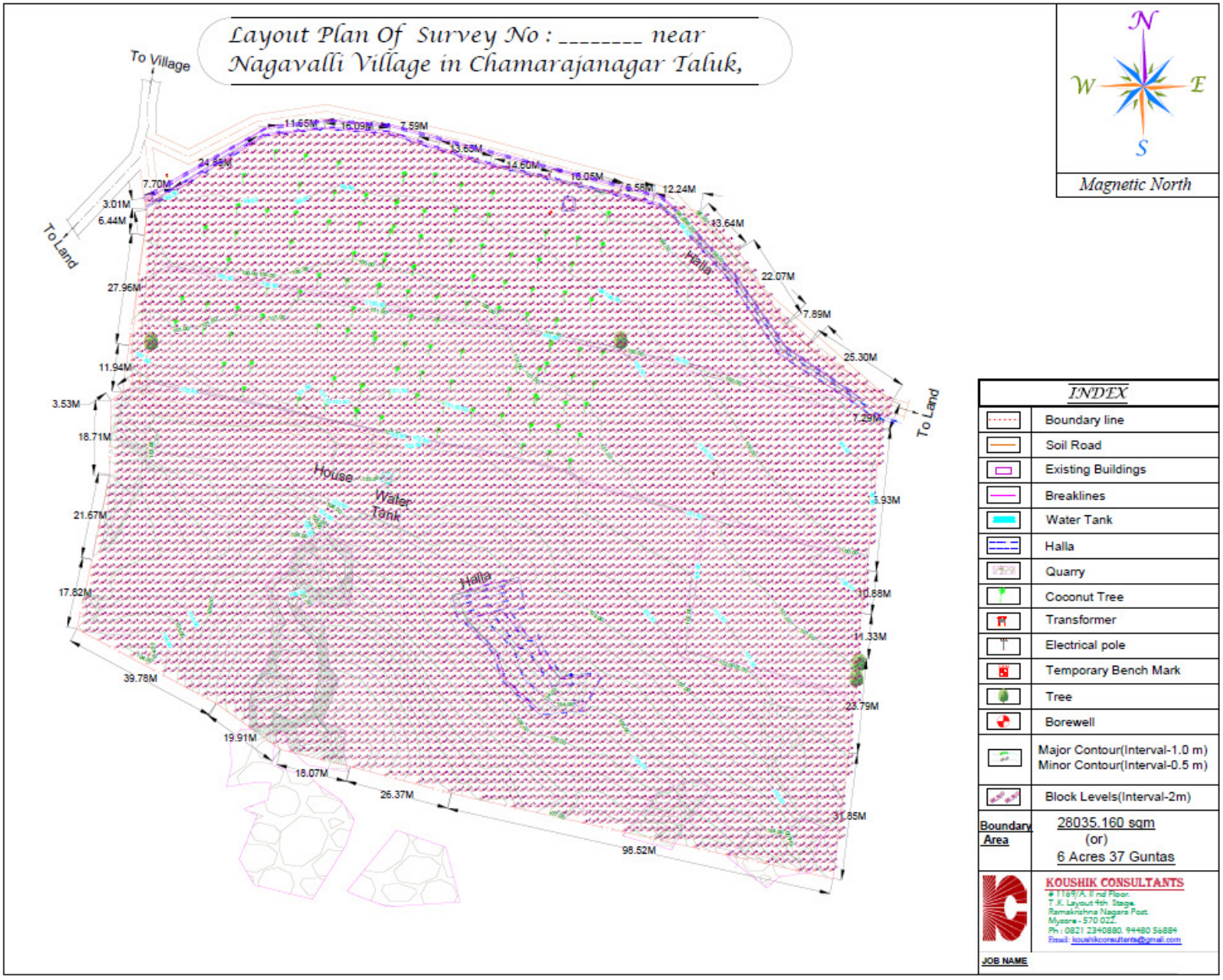
Secondary literature survey – Alex to send articles if he finds them. Talk to Vasavi

- Social
- Agronomic
- Ecological
- Wildlife
- Economic
- Visual (photo points)
- Carbon Foot prints

References

Annexure 1: Map of the campus and the surrounding area

Annexure 2: Contour map (campus and overlay on surroundings)



Annexure 3: Soil analysis results

Sample (1) (2114)

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ಭಾಕೃಅನುಪ ICAR

ರಶೀದಿ ಸಂಖ್ಯೆ: 6676/17 07/14

ರೈತನ ಹೆಸರು: ಶ್ರೀನಿವಾಸ ಪ್ರಸಾದ್ ನಿಡುವಳಿಕೆ

ಜಮೀನಿನ ಸರ್ವೆ ನಂ:

ವಿಳಾಸ:

ದಿನಾಂಕ: 04/08/2014

ಮಣ್ಣು ಪರೀಕ್ಷಾ ವರದಿ

ಕ್ರ.ಸಂ	ವಿವರ	ಪ್ರಮಾಣ	ವರ್ಗ
1	ರಸಸಾರ	7.72	ಹುಳಿ : ತಟಸ್ಥ : ಚೌಳು : ಕ್ಷಾರ
2	ಕರಗುವ ಲವಣಾಂಶ (ಡೆ.ಸೈ./ಮೀ)	0.088	ಸಾಮಾನ್ಯ : ಅಪಾಯಕಾರಿ : ಹಾನಿಕಾರಕ
3	ಸಾವಯವ ಇಂಗಾಲ (%)	0.36	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
4	ದೊರೆಯುವ ಸಾರಜನಕ (ಕೆ.ಜಿ./ಹೆ)	163.1	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
5	ದೊರೆಯುವ ರಂಜಕ (ಕೆ.ಜಿ./ಹೆ)	18.5	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
6	ದೊರೆಯುವ ಪೊಟ್ಯಾಷ್ (ಕೆ.ಜಿ./ಹೆ)	150.5	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು

ಮಣ್ಣಿನ ಸುಧಾರಣೆಗೆ ಸಲಹೆಗಳು:

ಅ) ಹುಳಿ ಮಣ್ಣು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಕೆ.ಜಿ. ಕೃಷಿ ಸುಣ್ಣ (—)ವನ್ನು ಬೆಳೆ ಮಾಡುವ ಒಂದು ತಿಂಗಳಿಗೂ ಮೊದಲು ಮಣ್ಣಿಗೆ ಬೆರಸಿ.

ಆ) ಕ್ಷಾರ ಮಣ್ಣನ್ನು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಟನ್ ಜಿಪ್ಸಂ ಮಣ್ಣಿಗೆ ಬೆರೆಸಿ, ಬಸಿಗಾಲುವೆ ತೆಗೆದು, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ಇ) ಲವಣಾಂಶವು ಅಪಾಯಕಾರಿ ಮತ್ತು ಹಾನಿಕಾರಕ ಮಟ್ಟದಲ್ಲಿದ್ದರೆ ಬಸಿಗಾಲುವೆ ತೋಡಿ, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

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ರೈತನ ಹೆಸರು: ಶ್ರೀನಿವಾಸ ಪ್ರಸಾದ್ ಜಮೀನಿನ ಸರ್ವೆ ನಂ:

ವಿಳಾಸ: ನಾಗಿಲಪುರ ದಿನಾಂಕ: 04/08/2014

ಮಣ್ಣು ಪರೀಕ್ಷಾ ವರದಿ

ಕ್ರ.ಸಂ	ವಿವರ	ಪ್ರಮಾಣ	ವರ್ಗ
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3	ಸಾವಯವ ಇಂಗಾಲ (%)	0.27	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
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6	ದೊರೆಯುವ ಪೊಟ್ಯಾಷ್ (ಕೆ.ಜಿ./ಹೆ)	163.0	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು

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ವಿಳಾಸ: ನಾಗಮಲೆಹಳ್ಳಿ ದಿನಾಂಕ: 04/08/2014

ಮಣ್ಣು ಪರೀಕ್ಷಾ ವರದಿ

ಕ್ರ.ಸಂ	ವಿವರ	ಪ್ರಮಾಣ	ವರ್ಗ
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3	ಸಾವಯವ ಇಂಗಾಲ (%)	0.39	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
4	ದೊರೆಯುವ ಸಾರಜನಕ (ಕೆ.ಜಿ./ಹೆ)	150.5	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
5	ದೊರೆಯುವ ರಂಜಕ (ಕೆ.ಜಿ./ಹೆ)	20.8	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
6	ದೊರೆಯುವ ಪೊಟ್ಯಾಷ್ (ಕೆ.ಜಿ./ಹೆ)	171.5	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು

ಮಣ್ಣಿನ ಸುಧಾರಣೆಗೆ ಸಲಹೆಗಳು:

ಅ) ಹುಳಿ ಮಣ್ಣು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಕೆ.ಜಿ. ಕೃಷಿ ಸುಣ್ಣ (—)ವನ್ನು ಬೆಳೆ ಮಾಡುವ ಒಂದು ತಿಂಗಳಿಗೂ ಮೊದಲು ಮಣ್ಣಿಗೆ ಬೆರಸಿ.

ಆ) ಕ್ಷಾರ ಮಣ್ಣನ್ನು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಟನ್ ಜಿಪ್ಸಂ ಮಣ್ಣಿಗೆ ಬೆರೆಸಿ, ಬಸಿಗಾಲುವೆ ತೆಗೆದು, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ಇ) ಲವಣಾಂಶವು ಅಪಾಯಕಾರಿ ಮತ್ತು ಹಾನಿಕಾರಕ ಮಟ್ಟದಲ್ಲಿದ್ದರೆ ಬಸಿಗಾಲುವೆ ತೋಡಿ, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

Yogesh

ವಿಷಯ ತಜ್ಞರು
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ಕೃಷಿ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಬೆಂಗಳೂರು
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ರಶೀದಿ ಸಂಖ್ಯೆ: 6676/17/07/14

ರೈತನ ಹೆಸರು: ಶ್ರೀನಿವಾಸ ಪ್ರಸಾದ್

ಜಮೀನಿನ ಸರ್ವೆ ನಂ:

ವಿಳಾಸ: ನಾಗಲವಾಡಿ

ದಿನಾಂಕ: 04/08/2014

ಮಣ್ಣು ಪರೀಕ್ಷಾ ವರದಿ

ಕ್ರ.ಸಂ	ವಿವರ	ಪ್ರಮಾಣ	ವರ್ಗ
1	ರಸಸಾರ	7.46	ಹುಳಿ : ತಟಸ್ಥ : ಚೌಳು : ಕ್ಷಾರ
2	ಕರಗುವ ಲವಣಾಂಶ (ಡೆ.ಸೈ./ಮೀ)	0.109	ಸ್ವಾಮ್ಯಾನ್ಯ : ಅಪಾಯಕಾರಿ : ಹಾನಿಕಾರಕ
3	ಸಾವಯವ ಇಂಗಾಲ (%)	0.30	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
4	ದೊರೆಯುವ ಸಾರಜನಕ (ಕೆ.ಜಿ./ಹೆ)	163.1	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
5	ದೊರೆಯುವ ರಂಜಕ (ಕೆ.ಜಿ./ಹೆ)	17.2	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
6	ದೊರೆಯುವ ಪೊಟ್ಯಾಷ್ (ಕೆ.ಜಿ./ಹೆ)	188.2	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು

ಮಣ್ಣಿನ ಸುಧಾರಣೆಗೆ ಸಲಹೆಗಳು:

ಅ) ಹುಳಿ ಮಣ್ಣು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಕೆ.ಜಿ. ಕೃಷಿ ಸುಣ್ಣ (—)ವನ್ನು ಬೆಳೆ ಮಾಡುವ ಒಂದು ತಿಂಗಳಿಗೂ ಮೊದಲು ಮಣ್ಣಿಗೆ ಬೆರಸಿ.

ಆ) ಕ್ಷಾರ ಮಣ್ಣನ್ನು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಟನ್ ಜಿಪ್ಸಂ ಮಣ್ಣಿಗೆ ಬೆರೆಸಿ, ಬಸಿಗಾಲುವೆ ತೆಗೆದು, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ಇ) ಲವಣಾಂಶವು ಅಪಾಯಕಾರಿ ಮತ್ತು ಹಾನಿಕಾರಕ ಮಟ್ಟದಲ್ಲಿದ್ದರೆ ಬಸಿಗಾಲುವೆ ತೋಡಿ, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ವಿಷಯ ತಜ್ಞರು
(ಮಣ್ಣು ವಿಜ್ಞಾನ ಮತ್ತು ಕೃಷಿ ರಸಾಯನಶಾಸ್ತ್ರ)
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ರಶೀದಿ ಸಂಖ್ಯೆ: 6676/19 07/14

ರೈತನ ಹೆಸರು: ಶ್ರೀನಿವಾಸ ಪ್ರಸಾದ್

ಜಮೀನಿನ ಸರ್ವೆ ನಂ:

ವಿಳಾಸ: ನಾಗಲಿಕೆ

ದಿನಾಂಕ: 04/08/2014

ಮಣ್ಣು ಪರೀಕ್ಷಾ ವರದಿ

ಕ್ರ.ಸಂ	ವಿವರ	ಪ್ರಮಾಣ	ವರ್ಗ
1	ರಸಸಾರ	7.46	ಹುಳಿ : ತಟಸ್ಥ : ಚೌಳು : ಕ್ಷಾರ
2	ಕರಗುವ ಲವಣಾಂಶ (ಡೆ.ಸೈ./ಮೀ)	0.109	ಸಾಮಾನ್ಯ : ಅಪಾಯಕಾರಿ : ಹಾನಿಕಾರಕ
3	ಸಾವಯವ ಇಂಗಾಲ (%)	0.30	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
4	ದೊರೆಯುವ ಸಾರಜನಕ (ಕೆ.ಜಿ./ಹೆ)	163.1	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
5	ದೊರೆಯುವ ರಂಜಕ (ಕೆ.ಜಿ./ಹೆ)	17.2	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
6	ದೊರೆಯುವ ಪೊಟ್ಯಾಷ್ (ಕೆ.ಜಿ./ಹೆ)	188.2	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು

ಮಣ್ಣಿನ ಸುಧಾರಣೆಗೆ ಸಲಹೆಗಳು:

ಅ) ಹುಳಿ ಮಣ್ಣು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಕೆ.ಜಿ. ಕೃಷಿ ಸುಣ್ಣ (—)ವನ್ನು ಬೆಳೆ ಮಾಡುವ ಒಂದು ತಿಂಗಳಿಗೂ ಮೊದಲು ಮಣ್ಣಿಗೆ ಬೆರಸಿ.

ಆ) ಕ್ಷಾರ ಮಣ್ಣನ್ನು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಟನ್ ಜಿಪ್ಸಂ ಮಣ್ಣಿಗೆ ಬೆರೆಸಿ, ಬಸಿಗಾಲುವೆ ತೆಗೆದು, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ಇ) ಲವಣಾಂಶವು ಅಪಾಯಕಾರಿ ಮತ್ತು ಹಾನಿಕಾರಕ ಮಟ್ಟದಲ್ಲಿದ್ದರೆ ಬಸಿಗಾಲುವೆ ತೋಡಿ, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ವಿಷಯ ತಜ್ಞರು
(ಮಣ್ಣು ವಿಜ್ಞಾನ ಮತ್ತು ಕೃಷಿ ರಸಾಯನಶಾಸ್ತ್ರ)
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(5) (2118)

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ರಶೀದಿ ಸಂಖ್ಯೆ: 6676/17 07/14

ರೈತನ ಹೆಸರು: ಪುನೀತ್ ಪ್ರಸಾದ್

ಜಮೀನಿನ ಸರ್ವೆ ನಂ:

ವಿಳಾಸ: ನಾಗಮಲೆ

ದಿನಾಂಕ: 04/08/2014

ಮಣ್ಣು ಪರೀಕ್ಷಾ ವರದಿ

ಕ್ರ.ಸಂ	ವಿವರ	ಪ್ರಮಾಣ	ವರ್ಗ
1	ರಸಸಾರ	8.25	ಹುಳಿ : ತಟಸ್ಥ : ಚೌಳು : ಕ್ಷಾರ
2	ಕರಗುವ ಲವಣಾಂಶ (ಡೆ.ಸೈ./ಮೀ)	0.123	ಸಾಮಾನ್ಯ : ಅಪಾಯಕಾರಿ : ಹಾನಿಕಾರಕ
3	ಸಾವಯವ ಇಂಗಾಲ (%)	0.27	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
4	ದೊರೆಯುವ ಸಾರಜನಕ (ಕೆ.ಜಿ./ಹೆ)	87.8	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
5	ದೊರೆಯುವ ರಂಜಕ (ಕೆ.ಜಿ./ಹೆ)	19.8	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
6	ದೊರೆಯುವ ಪೊಟ್ಯಾಷ್ (ಕೆ.ಜಿ./ಹೆ)	172.8	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು

ಮಣ್ಣಿನ ಸುಧಾರಣೆಗೆ ಸಲಹೆಗಳು:

ಅ) ಹುಳಿ ಮಣ್ಣು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಕೆ.ಜಿ. ಕೃಷಿ ಸುಣ್ಣ (—)ವನ್ನು ಬೆಳೆ ಮಾಡುವ ಒಂದು ತಿಂಗಳಿಗೂ ಮೊದಲು ಮಣ್ಣಿಗೆ ಬೆರಸಿ.

ಆ) ಕ್ಷಾರ ಮಣ್ಣನ್ನು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಟನ್ ಜಿಪ್ಸಂ ಮಣ್ಣಿಗೆ ಬೆರೆಸಿ, ಬಸಿಗಾಲುವೆ ತೆಗೆದು, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ಇ) ಲವಣಾಂಶವು ಅಪಾಯಕಾರಿ ಮತ್ತು ಹಾನಿಕಾರಕ ಮಟ್ಟದಲ್ಲಿದ್ದರೆ ಬಸಿಗಾಲುವೆ ತೋಡಿ, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ವಿಷಯ ತಜ್ಞರು
(ಮಣ್ಣು ವಿಜ್ಞಾನ ಮತ್ತು ಕೃಷಿ ರಸಾಯನಶಾಸ್ತ್ರ)
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(6) (2119)

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ರಶೀದಿ ಸಂಖ್ಯೆ: 6676/1707/14

ರೈತನ ಹೆಸರು: ಪುನೀತ್ ಪ್ರಸಾದ್

ಜಮೀನಿನ ಸರ್ವೆ ನಂ:

ವಿಳಾಸ: ನಾಗಮಲೆ

ದಿನಾಂಕ: 04/08/2014

ಮಣ್ಣು ಪರೀಕ್ಷಾ ವರದಿ

ಕ್ರ.ಸಂ	ವಿವರ	ಪ್ರಮಾಣ	ವರ್ಗ
1	ರಸಸಾರ	7.80	ಹುಳಿ : ತಟಸ್ಥ : ಚೌಳು : ಕ್ಷಾರ
2	ಕರಗುವ ಲವಣಾಂಶ (ಡೆ.ಸೈ./ಮೀ)	0.102	ಸಾಮಾನ್ಯ : ಅಪಾಯಕಾರಿ : ಹಾನಿಕಾರಕ
3	ಸಾವಯವ ಇಂಗಾಲ (%)	0.24	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
4	ದೊರೆಯುವ ಸಾರಜನಕ (ಕೆ.ಜಿ./ಹೆ)	113.0	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
5	ದೊರೆಯುವ ರಂಜಕ (ಕೆ.ಜಿ./ಹೆ)	20.8	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು
6	ದೊರೆಯುವ ಪೊಟ್ಯಾಷ್ (ಕೆ.ಜಿ./ಹೆ)	150.5	ಕಡಿಮೆ : ಮಧ್ಯಮ : ಹೆಚ್ಚು

ಮಣ್ಣಿನ ಸುಧಾರಣೆಗೆ ಸಲಹೆಗಳು:

ಅ) ಹುಳಿ ಮಣ್ಣು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಕೆ.ಜಿ. ಕೃಷಿ ಸುಣ್ಣ (—)ವನ್ನು ಬೆಳೆ ಮಾಡುವ ಒಂದು ತಿಂಗಳಿಗೂ ಮೊದಲು ಮಣ್ಣಿಗೆ ಬೆರಸಿ.

ಆ) ಕ್ಷಾರ ಮಣ್ಣನ್ನು ಸುಧಾರಿಸಲು ಎಕರೆಗೆ _____ ಟನ್ ಜಿಪ್ಸಂ ಮಣ್ಣಿಗೆ ಬೆರೆಸಿ, ಬಸಿಗಾಲುವೆ ತೆಗೆದು, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

ಇ) ಲವಣಾಂಶವು ಅಪಾಯಕಾರಿ ಮತ್ತು ಹಾನಿಕಾರಕ ಮಟ್ಟದಲ್ಲಿದ್ದರೆ ಬಸಿಗಾಲುವೆ ತೋಡಿ, ಒಳ್ಳೆಯ ಗುಣಮಟ್ಟದ ನೀರನ್ನು ಹಾಯಿಸಿ ಬಸಿಯಿರಿ.

Yogesh

ವಿಷಯ ತಜ್ಞರು
(ಮಣ್ಣು ವಿಜ್ಞಾನ ಮತ್ತು ಕೃಷಿ ರಸಾಯನಶಾಸ್ತ್ರ)

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ಕಾರ್ಯಕ್ರಮ ಸಂಯೋಜಕರು

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Annexure 4: Water analysis results

2100

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ರಶೀದಿ ಸಂಖ್ಯೆ: 6503/01/08/14

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ನೀರಿನ ಪರೀಕ್ಷಾ ವರದಿ

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ವಿಷಯ ತಜ್ಞರು
(ಮಣ್ಣು ವಿಜ್ಞಾನ ಮತ್ತು ಕೃಷಿ ರಸಾಯನಶಾಸ್ತ್ರ)
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Annexure 5: List of appropriate trees and other crops

Millets

- Ragi / Finger millet (*Eleusine coracana*)
- Jowar/Sorghum (*Sorghum sp*)
- Navane / Foxtail millet (*Setaria italica*) (used to be grown earlier but not now)
- Bajra / Pearl millet (*Pennisetum glaucum*)
- Gurjee millet

Oil seeds

- Groundnut (*Arachis hypogeal*)
- Niger / huchellu (*Guizotia abyssinica*)
- Sesame (*Sesamum indicum*)
- Sunflower (*Helianthus annuus*)
- Castor (*Ricinus communis*)

Pulses

- Green gram/mung bean (*Vigna radiata*)
- Toor/ red gram/pigeon pea (*Cajanus cajan*)
- Horsegram (*Macrotyloma uniflorum*)
- Masoor/lentil (*Lens culinaris*)
- Chick pea/gram (*Cicer arietinum*)
- Cow pea (*Vigna unguiculata*)
- Beans

Other crops

- Chilli
- Marigold

Tree crops

- Dryland drumstick (*Moringa oleifera*)
- Chiku/Sapota (*Manilkara zapota*)
- Amla/Indian gooseberry/Nelli (*Emblica officinalis*)
- Star Gooseberry/Nelli (*Phyllanthus acidus*)
- Mango (*Mangifera indica*)
- Jackfruit/Halasu (*Artocarpus heterophyllus*)
- Mulberry (*Morus spp.*)
- Pomegranate (*Punica granatum*)
- Hunase (*Tamarindus indica L.*)
- Guava (*Psidium gujava)*
- Sitaphal (*Annona squamosa*)

- Citrus varieties (lemon, lime, citron)
- Bael (Vilva *Aegle marmelos*)

Annual Cover Crops

Legumes are often tilled into the soil to provide nitrogen and organic matter. Mustard crops may be used prior to planting other crops to reduce nematode populations, through the production of certain chemicals upon decomposition that are similar to soil fumigants. Some common annual cover crops are:

- Annual Ryegrass (*Lolium multiflorum*)
- Field pea (*Pisum sativum*)
- Mustard Crops (*Brassica* and *Sinapsis* spp.) – White mustard (*Sinapis alba*), Oriental or Indian mustard (*B. juncea*), and Rapeseed (*B. napus*)

Perennial Cover Crops

Perennial cover crops offer the benefit of providing soil cover for multiple seasons without replanting. Many drought-tolerant grasses are dormant during the dry season, when irrigation is limiting, and regrow when precipitation increases soil available water. Native mixes of grasses and wildflowers will perform best, as germination and establishment are optimized for that particular location. Some examples of perennial cover crops are:

- Indian ricegrass (*Oryzopsis hymenoides* or *Achnatherum hymenoides*)
- Perennial ryegrass (*Lolium perenne*)
- White clover (*Trifolium repens*)
- Wildflower and forb mixes (Various species)

Shrubs

Lakki soppu
Adusoge
Kalli
Castor
Halvaana

*Living fence (*multi-purpose and multi species*)*

Aurculis	*Acacia auriculiformis*	14m	N fixing	Fast growing	Wind break		
Agave							
Chikka kaadu nelli	*Phyllantus emblica L.*	10m		Medium growing			Food
Eechalu	*Phoenix sylvestris L.*	12m		Slow growing	Wind break		Food
Giripushpa	*Gliricidia sepium*	10m	N fixing	Fast growing		Fodder	
Honge	*Pongomia pinnata L.*	12m	N fixing	Fast growing	Wind break		
Hunase	*Tamarindus indica L.*	24m	N fixing	Slow growing	Wind break	Fodder	Food

Ippe	*Madhuca longifolia L.*	15m		Slow growing	Wind break	Fodder	
Jaali	*Prosopis juliflora*	12m	N fixing	Fast growing			Food
Maddi mara	*Morinda coreia*	5m		Slow growing	Wind break	Fodder	
Muttaga	*Butea monosperma*	9m	N fixing	Medium growing	Wind break		
Nagare	*Ximencia Americana L.*	5m		Fast growing		Fodder	Food
Sarve mara	*Casuarina esquisetifolia L.*	16m	N fixing	Fast growing	Wind break		
Sitaphala	*Annona squamosa L.*	4m		Fast growing			Food
Sujjali	*Albizia amara*	6m	N fixing	Slow growing	Wind break	Fodder	
Yelchi	*Ziziphus Mauritania Lam.*	8m		Fast growing	Wind break	Fodder	Food

More species could include

1. *Cassia fistula* (Indian Laburnum, Amaltash) Yellow flowers
2. *Albizia lebbeck* (Siris)
3. *Neem*
4. *Bauhinia*
5. *Butea monopserma (*Mutuga, Flame of the Forest)
6. *Ficus bengalensis* var. *krishnae* (Krishna's butter cup)
7. *Erythrina* (Indian Coral Tree)
8. *Borassus flabellifer* (Tale mara)
9. *Sapindus emarginatus (Antuvala kai/ Ritha)*
10. *Cassia siamea*
11. *Calliandra (Powder Puff)*
12. *Hebbevu (Melia dubia)*

Annexure 6: List of Home Garden plants

Vegetables (*names of varieties alongside main name*)

Amaranth Bicolor	Brinjal Mussuku	Bottle Gourd Big
Amaranth Green	Brinjal Vadhiraja Round	Bottle Gourd Small
Amaranth Red	Chilli (Shrub)	Bottle Gourd Tamboora
Amaranth Rajgira	Chilli Black	Ridge Gourd Big
Bean (Shrub/Climber)	Chilli Bugadi	Ridge Gourd Small
Bean 30 Day	Chilli Hittalu	Sponge Gourd
Bean Angikase	Chili Jasmine	Lady's Finger (Shrub)
Bean Baji	Chilli Kutumba	Lady's Finger Green
Bean Hyacinth	Chilli Majjige	Lady's Finger Red
Bean Lima	Chilli Melmukhada	Lady's Finger Sparrow
Bean Rajma	Chilli Needle	Lady's Finger Sri Lanka
Bean Snake/Metre	Capsicum	Lady's Finger Yelu Yelay
Bean Sword	Cucumber Kadagolu	Lady's Finger Oxhorn
Bean Velvet	Cucumber Maggay	Maize
Bean Winged	Cucumber Mekkay	Pumpkin (Creeper)
Bean Winter	Cucumber Sambar	Pumpkin Long
Brinjal (Shrub)	Cucumber Spiny	Pumpkin Round
White Brinjal	Cucumber Yeray	Pumpkin Summer
Brinjal Cholu	Ash Gourd	Purslane
Brinjal Daas	Bitter Gourd Light Green	Spinach
Brinjal Hittalu	Bitter Gourd Green	Tomato (Shrub)
Brinjal Metre	Bitter Gourd Mada (Wild)	Tomato Cherry
Brinjal Mulugai	Bitter Gourd Sparrow	Tomato Long
		Tomato Round

Flowers

Balsam	Cockscomb	Marigold
Butterfly Pea	Cosmos	Periwinkle

Tubers

Arrowroot	Dioscorea	Ginger
Cochin/Mango ginger	Elephant foot yam	Sweet potato (Genasu)
Colocasia (Kesu)	(Suvarnadadde)	Turmeric

Annexure 7: Survey of flora and avifauna Abhisheka K. and Saleem Hameed

Preliminary survey of PC land, Putanpura

On the 30th of April and 1st of May 2014 a preliminary survey of biodiversity and photo documentation of PC land at Puttanpura village was conducted. The weather was extremely hot during the day but it did rain heavily on the evening of 30th April around 5.30pm.

No specific methodology was followed for the survey of flora and fauna as the land was mostly dry with very less vegetation cover. Grasses and shrubs had dried up due to lack of water, also grazing of cattle by neighboring farmers had inhibited the growth of vegetation. Neem (*Azadirachta india*), Flame of the forest (*Butea monosperma*) and *Wrightia tinctoria* species are growing well in the land. There seem to be few species of edible greens too in the coconut farm. The vegetation survey might yield good results if surveyed after the rains.

Bird survey was carried out from 4.30pm – 5.30pm on 30th April, 7.30am – 8.30am on 1st April and again at 4.30pm – 5.30pm. We chose 4 different points and watched birds for about 15min at each point.

Point 1: At the entrance to the land

Point 2: From the neem tree above the quarry

Point 3: Banni Tree

Point 4: Bottom most neem tree near the coconut farm

About 27 species of birds were spotted in the land and they were mostly insectivores, granivores and scavengers. Though bird species like Blue-faced Malkoha, Common Hawk-Cuckoo, White-breasted Waterhen and Common Iora were spotted in the neighboring farmland, they were missing in PC land due to the lack of green cover. A family of Common mongoose; mother with 3 babies was also spotted on the way to PC land. Red-wattled Lapwings seemed to have nested in the land as we saw broken egg shells near a dried up water pool and the birds gave alarm calls when they spotted us.

Photo documentation:

Five points were chosen to photograph the land which can be kept constant for photographing the change in landscape in the coming years.

Point 1: At the entrance to the land; left angle facing the coconut farm

Point 2: Neem tree above the quarry – Right angle

Point 2: Left angle

Point 3: Banni Tree- right angle

Point 4: Bottom most neem tree - facing coconut farm

Point 5: Pump house – Right angle (facing BR hills)

Point 5: Pump house –left angle (facing the cliff)

Apart from these fixed points few more general photographs were taken of the land.

Checklist of Birds at PC land, Puttanpura

Sl.No.	*Direct sightings*	*Location*	*calls*
1	Ashy Prinia	on land	White breasted waterhen
2	Black kite	in flight	Common Hawk-Cuckoo
3	Blue-rock Pigeon	in flight	Peafowl
4	Brahminy Kite	in flight	Common Iora
5	Eurasian Collared dove	on land	
6	Honey Buzzard	in flight	
7	House Crow	in flight	
8	Indian Myna	on land	
9	Indian Robin	on land	
10	Indian Silverbill	on land	
11	Jungle crow	on land	
12	Laughing Dove	on land	
13	Lesser Coucal	on land	
14	Little Egret	in flight	
15	Pied Bushchat	on land	
16	Purple Sunbird	on land	
17	Purple-rumped Sunbird	on land	
18	Red-vented Bulbul	on land	
19	Red-wattled Lapwing	on land	
20	Red-whiskered Bulbul	on land	
21	Rose-ringed parakeet	on land	
22	Red-rumped Swallow	in flight	
23	Rufous-winged bushlark	on land	
24	Short-toed Snake Eagle	in flight	
25	Tailor bird	on land	
26	White-browed Bulbul	on land	
27	White-throated Kingfisher	on land	

Plants			
Sl.No.	***Common Name***	***Botanical Name***	***Kannada name***
1	Asiatic Tarenna	*Tarenna asiatica*	
2	Touch me not	*Mimosa pudica*	Muttidare muni
3	Bitter Bush	*Chromolaena odorata*	
4		*Lantana camara*	
5	Sweet Indrajao	*Wrightia tinctoria*	Ajamara, Kodamurki
6	Velvet mesquite	*Prosopis juliflora*	Jaali
7	Giant Milk Weed	*Calotropis gigantea*	yakka
8	Coat Button	*Tridax procumbens*	
9	Jamaican blue spike	*Stachytarpheta jamaicensis*	Kaadu uttarani
10	Congress grass	*Parthenium hysterophorus*	Congress gida
12	Tanner's Cassia	*Senna auriculata*	Seeme tangadi / Nada avarike
13	Date Palm	*Phoenix sp*	Eechalu
14	Roundleaf Kariyat	*Andrographis serpyllifolia*	
15		*Strychnos spp*	
16	Dwarf Morning Glory	*Evolvulus alsinoides*	Vishnukanti
17	Common Tephrosia	*Tephrosia purpurea*	Empali
18	Sand Paper Tree	*Streblus asper*	Mitala, Punjai
19	Toothbrush tree	*Capparis zeylanica*	
20		*Lamiaceae sp*	
21	Clearing-Nut Tree	*Strychnos potatorum*	Itti mara
22	Prickly pear cactus	*Opuntia elatior*	
23	Cactus	*Euphorbia sp*	
24		*Dodonia sp*	
25	Adament creeper	*Cissus quadrangularis*	
26		*Croton bonblandiana*	
27		*Flacourtia indica*	
28		*Bauhinia sp.*	
29		*Canthium coramandalea*	
30		*Convolvulacea*	
31		*Hemidesmus sp.*	Gandu nela magali
32		*Waltheria sp.*	
33			badra kooli soppu

Trees			
Sl.No.	***Common Name***	***Botanical Name***	***Kannada name***
1	Coconut Palm	*cocus nucifera*	Tengu
2	Neem	*Azadirachta indica*	Bevu
3	Flame of the forest	*Butea monosperma*	Muttuga

4		*Acacia ferruginea*	Banni
5	Jamun	*Syzygium*	Nerale
		Miliusa tomentosa	
6		*???*	

Annexure 8: Campus vision by Punarchith team prior to survey

The following questions and issues were discussed with the PC team regarding their vision of the land and its role as a campus

1. What is your vision for the land/proposed campus?

- to restore the land

- show an alternative way of integrated agriculture/life

- welcome students and offer experimental land for application and experiential learning

– *residential*

2. What kind of layout do you have in mind? What are the particular features you would like to see in place? *Both physical and process-wise.*

3. What sort of agri-horticulture if any, would you like to see for the land?

4. Do you plan to live on the land or commute back and forth?

5. How many people do you feel should stay on the land and for what purpose?

6. Will the campus later have residential programmes with students staying there? For what periods of time?

7. Is there any other land in the vicinity where agriculture is practiced along with restoration of forests or wild flora?

8. Independence of the campus? (ecological, economic and social audit will be done for everything) Usage, dependence and orientation are factors for consideration

-energy?

-water?

-organic inputs

9. What kind of *water management* should we have including source of water and its consumption for irrigation, human consumption etc.

Borewell ? Location of borewell? or rainfed tank? (dryland agriculture and rain fed crops) Irrigation for small patches and home gardens with rain and recycled water.

How do we collect rain water?

Water recycling – grey and black

Which system of irrigation will be used? How much land can we irrigate with rain water.

10. Estimate the consequence of agriculture on the land

11. *Sanitation:*

How will waste output of all kinds be treated?

12. What kind of livestock could be kept? Should some land be used as pasture?

13. Source of organic material from another place? Lake bed silt, neighbouring FYM, plant biomass.

July 8/9, 2014

Vasavi:

Ideally, I would like to see the land as a campus that houses about 100 people and works as a centre for alternative agriculture and life systems. Of course this is totally subject to what the land can support. At the other end of the spectrum, we should just wait out a year and see what sort of restoration work can be done, if RWH is possible, and if it is worth constructing something at the pump house for a caretaker to stay there. I do not see myself staying there if there are no educational activities there. We will also have to see how the course goes and how well the community receives it. The land can also serve as a model really, I am prepared for anything.

Badri:

In order of priority, survey of land to be completed in order to have the right picture of the boundaries. For the first year, a caretaker who will at least come during the day to work. A shelter for him perhaps above the first small quarry that will have a full view of the land. Countour bunds and then saplings from the forest dept to be planted this season. Ready the fields and sow pulses to see how they do this with just rains. Recharge bore and take a call in the second year about sinking a new borewell. Must have residential programmes. At least 50 people to visit over 2 – 3 days. Daily staff max 10-15 on the land.

Buildings need to include dorms for sleeping. Separate for boys and girls. Workshop needed. Home garden centre near the house. Agriculture and home garden land should ideally be adjacent or very close. Common tool shed for agri/home gardens. Explore solar power for energy needs.

Sunita:

I would like to first of all see what sort of history the land and its environs have had. Then to assess what sort of activities are possible and in tune with the local ecology. Restoration is important and also to see how to best optimise the land to get it to yield some appropriate food crops, make it habitable for x number of people (the number may be small) and as a place that visitors can come to to learn from. If possible, a small home garden resource centre – like a place for art-ecology. Yes, I would like to live on the campus part time if the Punarchith work takes off and there is a supporting team.

Muthuraju:

Important to have someone stay on the land. Focus on rain fed, drought tolerant crops.

Rajappa:

Water of prime importance. Use of quarry as an amphitheater with bamboo and cloth for green room etc. Will be a unique feature of the district and can use the space to have public performances and attract people.

Alex:

He is reserving his major opinions for later. Initial feelings include RWH as a major source of water, planning for a building area, classroom/workshop. Larger groups for 1-2 nights only and at the most have 5 permanent people once the water issue is sorted out. Important to consume what is grown as part of the overall sustainable model.

Annexure 9: Table Of Resource Persons/Agencies

Resource	Name and address	Email & Phone
Soil		
Water	Krishi Vigyan Kendra	
Contour mapping		
Rain water harvesting		
Horticulture		
Agriculture		
Forest saplings		
Architecture and buildings		
Landscaping		