CHAPTER-2
REVIEW OF LITERATURE

2.1 INTRODUCTION

This chapter consists of reviews of literature which is relevant to the study. It mainly emphasis on different kinds of mining, policy issues linked to mining, impacts of mining and land use conflicts, impacts of mining on the physical and chemical properties of soils, effects of trees on soil chemical properties, effects of vegetation removal on soil physical and chemical properties, gravel on above ground biomass and potentials for rehabilitating abandoned mined sites among others, reuse of marble powder and slurry.

Literature on various aspects of reclamation of land degraded by marble slurry and various uses of marble waste all over the world is available amply.

Jordan,(1995) determined that one of the most important waste producing industry is the marble production industry, by which dimensional stone producer need special mitigative measures and environmental impact assessment to reduce the negative environmental impacts which produce from the industry. Various efforts are undertaken on bypassing such quandary were intensified viewed for the new regulations, strategies and legislations to minimize and reuse the waste which is generated.

In the starting environmental impact assessment study was carried out at eight marble industries distributed in Zarqa Governorate at north-west of the capital city Amman.

In the assessment testing of major chemical and physical parameters, main products and the byproducts generated from each concern according to the manufacturing stages and in accordance to the Jordanian environmental regulations and legislations in force. Results found that noise levels were above the International Standards, which require a more attention. In conditions with water and land
resources, dimensional waste products; anticipated to be approx 10% of the prime material extreme; from a source of pollution through the inappropriate solid and liquid waste dumping strategies adopted by the inspected manufacturers.

The research paper addressed the execution of chemical-stabilization wastewater dealing units to treat waste water before dumping it into the domestic sewage system, whereas solid waste should be dumped only in specific industrial plants.

Panagiotis Ch. Eskioglou (1996) in which a laboratory study was undertaken to calculate the effectiveness of marble dust as soil stabilizer. The study revealed that the geotechnical parameters of wooded soils are enhanced significantly to a large extent by the accumulation of marble dust. In the experiment the results were shown that plasticity was get reduced by 15% to 30% and strength was improved by 25% to 50%. Improvement in the released compressive potency of soil happens with the addition of marble dust.

According to *J.V. Natani and K.S. Raghav* (2003) that simple and unscientific mining poses serious hazard to life, public property and prolongation of mining in the area. Land uses which are incompatible vast waste dumps and transformation in the large scale land have caused land degradation, ponding, flooding, water contamination and health hazards can be seen in the Makrana mining area. Many methods have been taken to reclaim like segregation of dumps, compatible land use and various new activities and development for reuse of marble slurry to reclamation and restoration of the degraded land.

Siddharth Singh (2004) suggested many methods of biological reclamation for degraded mine land. He finds out re vegetation of mined out areas is very difficult due the chemical and physical qualities. One of the main reason is the deficiency of topsoil is the major common factor of to make the mine spoils or dumps even the top soil is very poor in nitrogen which is essential for the growth of the plant. This is happen due to poor quality of soil organic matter provided by decomposition of dead plant & materials. He suggested that for the improved results, some environmental
factors must be undertaken to select species or variety for plantation which will enhance the ability to stabilize soil, increase soil organic matter and accessible soil nutrients and ease under storey progress. Rapidly growing grasses with short life succession, legumes and forge crops are suggested. It will increase the soil nutrient and organic matter present in soil. Due to biological reclamation the productivity of land growth in flora and fauna can restores.

A.K Pandey et al (2005) revealed out the important study that due to the surface mining at makrana, the wildlife, water resources and soil biological systems are severally damaged. The main potential of environmental degradation is marble mining dust particulates matter and the dust from the stone crusher. He analyzed the samples collected from the various sampling stations and results found that the soil of makrana is alkaline because of high pH value and the excess presence of the sodium. Even, the agricultural fields near the mining area show meager growth reduce growth rate in yield of crops and vegetables.

Hanifi Binici et al (2007) experimented about the characteristics of concrete containing marble dusts & lime stone dusts which was analyzed. In which seven samples has been collected in the three series respectively and control was mix with 400 kg. Cement content. The control mixers mixed at the rate of 5, 10 and 15 % MD and LD respectively in place of called as fine sand aggregated. The strength of the comprehensive concrete was measured for 7, 28, 90 and 360 days and sodium sulphate resistance were for 12 months. Also, abrasion resistance and water penetration of concretes is measured and it has workability and abrasion resistance as equivalent to that of normal concrete. From the results it showed that the resistance is more with the rate of fine MD and LD. The research concluded that the more composition of the dust viewed a major enhance in the sodium sulphate which is the resistance of the concrete. Therefore the MD and LD used for more effective in concrete production.

C.Sensogut (2007) studied about the noise source and level raise in the mines, the impact of noise on the labor and the various mitigative measures suggest reducing these effects. The parameters which are efficient for hearing loss due to
noise depends upon the exposure period, noise level, age of workers and physical health of the workers. The noise is more than the permissible limits of that, there is no cure. Noise survey sampling is necessary to conduct to find out any over exposure in order to effectively remove or reduce them. Similarly, reduction of occupational noise in mines is an important point to make sure satisfactory and dynamic working atmosphere. Various administrative, engineering etc methods were suggested.

Fakher J.Aukour et al (2008) identified that the production of marble in a business sector, is having a great part to the Jordanian gross national income due to both large Jordinian industrial capacity and marble reserves. Researchers evaluate that the results found that due to marble industry is having a small amount of human impacts with slightly environmental hazards and the presented industry have to take mitigation measures to reduce the environmental impacts through providing systematic management. Particulate matters is the major environmental hazard of marble production as inspected to be developed from the various processes of marble production that needs accomplishment of the wet medium cutting processes in the marble manufactures. Dust impacts were also found in to bind with the top soil approx 5 cm at the surface. However, dust emission needs a proper management by the landscape, plantation of various resistant plants, water sprinkling system, the slurry which is produced from the cutting will directly take into the special designed tanks and then again reprocess in the slurry treatment and the various other mitigative measures have been suggested by the author.

G.Rizzo et al (2008) investigated about the disposal of slurries generated at the the time of various operation process of marble slabs .Currently, method was undertaken to dump the slurry which are used as fillers of dismantled quarries near the saw mills and called as a final step of reclamation. The slurries were analyzed by various methods like XR Diffraction, simultaneous thermal analysis, ICP/MS, ionic Chromatography, FTIR, UV-Vis, COD and TOC measurements and grain size analysis. From the various experiments results found that the slurry can contaminate the ground water; the Chemical oxygen demand was found high. The method
suggested that slurry must be treated to the treatment before dumping or otherwise recycled as a resultant raw material for a proper process.

A.K Misra et al (2009) evaluated that marble slurry dust can be called as a waste of marble industry, is can be utilized in the roads. They study reveals that moreover road can be construct with this waste; experiment performed by 20-30% of soil replaced by MSD for upper grade preparation. The work was carried out at CRRI on concrete design, various methodology adopted for construction, and the evaluation of the performance. In such various samples have been collect from Rajsamand district, the soil sample was collected from production site at Sirola to Kuncholi Road. Mixes of Soil-MSD were also prepared by using various technologies mixed with MSD. Use of MSD results shown that that the economically saving of soil in cost of natural soil material.

TK Sreedevi et al (2009) have examined about 13 categories of wastelands finds in India, which constitute about 20.17% of total geographical area. Nearly 83% of wastelands are found in north and south side. This analyses the classes of wastelands and different approaches to reclamation of these lands. Various suitable and efficient methods were suggested for reclamation of the land which is degraded by marble industry.

Kiran et al (2009) revealed that a very large part (20.16%) of total geographical region of the country is under the degraded land. Generally the author suggested about the native plant species which are beneficial for environmental rehabilitation because they can adapt the local conditions. Additionally, they have recommended various medicinal plant species have extended worldwide to reclaim the land. The demand of Indian medicinal plants has enlarged years by years in the global market and it helps us in the economy also. To convene the order of medicinal plants at global level we should reuse our degraded land of the nation. From the various research and make this healthy practice we have to save our crop land and cultivate the various medicinal plants. Researcher suggested that we should give more emphasis to the cultivation of medicinal plants in lights of the environmental conditions in the study region.
R.C. Gupta et al (2009) have worked on the progress of new technologies for mass consumption. In this research authors suggested the use of marble powder in a good quantity for the production of tiles.

Fakher J. Aukour et al (2009) examined the opportunity to recycle the marble sludge in various useful materials such as range house construction resources. With the use of marble sludge eco-blocks is manufactured which can be used or utilized in the houses & building. Through the maximum use of the components such as sludge for sand and other material required like mixed materials used in block manufacturing.

Bahar Demirel (2010) investigated the dust of the marble as a good substance as a binder of the concrete. In which an experiment was performed by selecting four different sites of concrete-mixtures by replace the fine sand. When the results were compared it shown that the substitution or we can say that addition of WMD replace the fine products and passing through a 0.25 mm sieve at exactly size has showed an enhancing effect on compressive strength. As Marble dust is a waste of from the marble production activities and also creates an environmental hazard. We have to take proper mitigative measures in that area in which marble is produced excessively and save our natural resources. The best method to utilize the marble waste in the normal strength concretes as an alternate for the very fine coagulation.

Surender Singh Chauhan (2010) evaluated that mining is basically an environment hazard activity where environment suffers for the economically. Alas!! The underneath geological resources are covered by the forest, vegetation, agriculture called as biological resources. So mining destroy the vegetation, deforestation displacement of habitat etc. The processing and quarrying of minerals causes the environmental pollution. However the habitat requires both the resources and cannot degrade the quality of underground resources. The most areas of the earth survive on the other biological resources. Especially in India the Mining Operations destruct the forest, habitat and biodiversity erosion. By the use of scientific mining we can save our ecological resources and reuse of wasteland by the eco-friendly alternates and solutions. Author explained this phenomenon by the case
study of Bijolia mining area in Rajasthan and reveals out the impact of mining on the environment.

G. Marras et al (2010) have investigated that the various methods for recovery and reuse of by-products coming from the marble mining and quarrying process. They have carried out a research to use this by-product with the other industrial methods. The best method was suggested in which the use of micronized stone powder in various applications for the building construction. This analysis focused on the Orosei the marble district area.

Asimina E. Domopoulou et al (2010) had worked globally about the recycling of marble waste into the clayey mixtures for the development of lightweight thermal insulating ceramics which can share as a sustainable development for the industry and it will help in economy also. The experiment performed in which the clay minerals mixed with 0-50 wt% marble waste were packed into disc-shaped specimens and heat up at 950°C. From the characteristics of the material we can observe that the successfully consolidated ceramics.

V. Sheoran et al (2010) have evaluated that mining of valuable resources results in varying micro organism’s niche, damage of the soil widely and it affects the vegetation. It leads to destruction of the major portion of land. The phenomenon to regain the environmental reliability of these barren land areas is known as Reclamation. In which it includes the management of various physico-chemical disturbances of soils such as the fertility of the soil, community of the microbes, pH and the types of the geochemical cycles that formulate the barren land productive.

By the accumulation of various natural nutrients into soil such as sludge from the treatment plant, saw dust, residues of wood, manures, with the natural nutrients the efficiency of the soil increases, as these amendments stimulate the microbial activity which thus can provide the organic matter & nutrients (N, P) to the soil. Mineral extraction damages the top soil during blasting, and restoration. The management of the top soil is an important phenomenon to increase the nutrients of the soil for reclamation. The best method for reclamation is re
vegetation this is the most commonly method to degrade the erosion and safe the soil from degradatation. The method for restoration is like the nitrogen fixing microbes on herbs, grasses, legumes and trees. The plantations of heavy metal tolerant species are useful for heavy metals and acidic soils. The Reclamation of derelict land is extremely multifaceted process.

Once the process of reclamation is completed the vegetation has developed, the measurement of the reclaimed site is important to calculate the accomplishment of reclamation. This paper contains biological, physical & chemical mine soil properties, their management to make top soil management, soil productive, vegetation of various species and evaluation of progress of reclamation.

Giriraj Kumar Songara etal (2010) has observed land use and land cover change driven by green marble in Kherwara Tehsil, Udaipur using Remote Sensing & GIS and As per his observation he concluded that due to the mining activity land use pattern is continuously changing at a very rapid rate and also the change in agriculture and forest land due to this activity will have the adverse impact on the atmosphere or environment.

A. Datar, P. Audet, and D. Mulligan (2011) comprehensive search of primary (journal) literature pertaining to post-mined land rehabilitation in India studied 57 studies from 1995 to 2011.Using the information of plant species considered for land rehabilitation, the presumed environmental outcomes and impacts of these re vegetation activities were analyzed. Author described about the four species (Karanj, Pongamia sp.; Shisham, Dalbergia sp.; Shirish, Albizia sp.; and, Neem, Azadirachta sp.) emerged as the most common species. It is studied that the features of these four tree species is the best for the utmost important to rehabilitee the agro-ecosystem function within the context of Indian post-mined landscapes.

Yasoda Saini et al (2011) focus on how the dust of the marble has reduced the quality of flora in and around Vishwakarma Industrial Area, Jaipur. The varieties of the flora growing were selected around the area and studied have been made like
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Dust retaining capacity, the dry weight ratio of leaf and Chlorophyll Content. The results showed that the receptive variety shows the immediate sign of the effluent. On the other hand the other species support to reduce the contamination. Study shows that a content of the chlorophyll in flora which are growing in the mention study area.

Dr. H. B. Sahu et al (2011) have observed the mining activities are having the impact on our ecosystem which is a subject of present environment degradation. Any degradation in the chemical and other properties of the surroundings affects the strength of the humans & wildlife. The other issues of the mine person’s are on the site is due to various pollutants particles is a matter of serious concern. The poisonous or we can say hazardous is having the permanent effect on the greenbelt and the surroundings area this can be permanent affects also. These are the major point of concern which cannot be taking so lightly by the government and the other industries various mitigative measures and policies have been suggested to reduce the affect of mining on our surrounding area and the health of the human beings.

Adewole M.B et al. (2011) have determined that how the marble mining process affects on the characteristics of soils of Southwestern Nigeria, from the results author explained about the reduction in the characteristics of the soil due to the various processes of mining. It was shown that there is a continuous decrease in bulk density and as well as increase in total porosity of soil at a distance of the lease area. pH is also changed greatly from 5.90 in the control site to 8.20 in highly contaminated soils. Nitrogen content, OC and P reduced because the number of dust particles has been increased on the site. Apart from \( \text{Mg}^{2+} \& \text{Ca}^{2+} \) reduced at a distance from the mine, \( \text{K}^+ \& \text{Na}^+ \) also get increased.

Akshaya Kumar Sabat et al (2011) studied about the effects of marble dust on of an expansive soil stabilized with optimum percentage of Rice Husk ash (RHA). A experiment was performed by the addition Marble dust to RHA stabilized expansive soil up to 30%, by dry weight of the soil, at an the increment of 5%. Some tests were performed on these samples after 7 days of curing. These tests are like Swelling pressure tests, Soaked California Bearing Ratio (CBR) tests, Durability
tests and compaction tests. Results showed that the Swelling pressure of expansive soil and Maximum Dry Density (MDD) goes on decreasing and Optimum Moisture Content (OMC) goes on increasing. From the Durability test results it was observed that the addition of Marble dust had made the RHA stabilized expansive soil durable.

Rania A.Hamza et al (2011) reported that the granite & marble industry has keep on increasing and the flourishing construction industry in Egypt. They found that the quantity of processing waste & mining waste has increasing day by day which is very hazardous due to both its manufacturing & processing technique and due to saline in nature, impacts a health of the humans. After the research they have found that marble and granite slurry cement bricks yield similar mechanical, in conditions of compressive strength and physical in terms of density and absorption properties.

Sangeeta Dhanwar (2011) had illustrated out a very important cause in which he found out that Periplaneta americana was exposed to marble slurry for 24, 48, 72 & 96 hours respectively and this effect was observed on the reproductive organs. This study revealed that marble slurry impacts on the morphological and histological representation of ovaries. The nuclei of follicular epithelium are damaged completely and the interfollicular tissues disappeared which is a serious threat exposed to the marble slurry.

M. I. El-Gammal et al (2011) had evaluated about the health risk assessment that might generate from marble manufactures in Damietta City. In which they had investigated about the impacts of dust on the lungs of rat. As per their observations they had suggested that marble workshops must be established within industrial zones to prevent environmental community inflicts and to allow better safe competition.

Sarina Kalia and Inderajeet Ratawal (2011) observed the soil pollution by marble slurry from the marble industries. Soil contains a mixture of nutrients & elements like chemical compounds and mineral oxygen, silicon, calcium, aluminum
etc. When the soil is mixed with the marble it will destroy the upper strata it cannot support the vegetation. After drying, the finer fraction of slurry carried by wind and causes serious air pollution. In the Roorkee they have found many uses of slurry by developing masonry cement, tiles, cellular concrete, distempers, gypsum plaster-based plane/fiber-reinforced boards and blocks.

Ishwar Chand Sharma et al (2012) investigated the effect of marble slurry on agricultural crops & lands were done, that is, on existing crops like wheat crops, garden grass and sunflower. The severity of the calamity is predicted from observations of damage. An overview of fatalities was done by work on the slurries from different parts of state (Rajasthan) and outside the state. The study here on marble slurry was restricted to chronic areas of Rajasthan only. They have concluded that pH of marble slurry was detected is 9.1 which makes it alkaline. Chemical Composition was determined that slurry from the marble would be a high quality mixture cheaper material is available to construction industry.

Omar M. Omar et al (2012) had experimented about the replacement of sand with limestone waste (LSW), with marble powder (M.P) as an additive on the concrete properties. He experimented that the substitute ratio of sand with limestone waste is approx 25%, 50%, and 75%. However the, proportions of marble powder is 5%, 10% and 15% in the concrete mixes. The analysis included various testing like indirect tensile strength, compressive strength, and modulus of elasticity, flexural strength and permeability. However, a better result was viewed with the limestone waste as fine cumulative in the presence of marble powder.

M. Naveen Saviour(2012 ) have found that sand is an important mineral for our society in protecting the environment, where this practice of sand and soil mining is becoming an environmental issue as the stipulate for sand increases in industry and construction. Mining and its related activities can be responsible for some amount of ecological degradation. In this article he had discussed about the positive and negative impacts due to soil and sand mining to the environment in Indian regions. Water Pollution is visible by the color variation of water in which most of the water bodies in the mine area differs from brown to reddish orange
color. The Contamination of Acid Mine Drainage (AMD) starts from mines and spoils, heavy metals leaching and settling of sand particles are the major causes of degraded the ground water quality.

Sangeeta Dhanwar (2012) had determined about the slurry powder is mixed with the soil. Slurry destroys the top soil strata, in which they have determined about the soil accumulates a variety of nutrients, chemical compounds and mineral oxygen and various elements are present in the top soil. After long time slurry becomes dry and detroit the quality of soil.

Francis J. Larney & Denis A. Angers (2012) had studied about the role of organic amendments in soil reclamation. Soils are degraded by the natural events or industrial activity. However, polluted or disturbed soils are deficient of organic matter with the comparison of adjoining composed land. He investigated about the organic amendments affects soil properties and describes the role of organic matters in the process of reclamation.

Mamta B. Rajgor et al (2013) studied was carried out regarding the reuse of the marble waste and also to get other alternative source of aggregates. In this study the areas where the use of waste material needs to be identified as a substitute for conventional raw materials. Stone waste can be used as a manufacture of Portland cement, Ceramic tiles, Thermo set Resin Composites, Limes and as filler in roads & embankments.

Viswakarma Amit et al (2013) have determined the marble slurry can be utilized to improve the properties of soil by some experiment. Reduce the effects of marble slurry dumped into open environment. One of the best method of the utilization of marble slurry can be utilized in black cotton soil is to improve the properties of the soil.

Ahmed Abu Hanieh et al (2013) suggested various measures regarding the sustainable development of stone and marble sector in Palestine. 3R’s principals are used to minimize the waste at each stage of mineral lifecycle and its marble
efficiency. Stone and marble sector is modeled using doughnut-model in account most of the factors influencing this sector.

Nutan Patel et al (2013) had investigated that marble waste can be used a development of low cost concrete. Now, days the price of material is keep on increasing so instead of we can use the waste material in a proper way. The possibilities have been find out to the use of marble waste powder in the mixing concretes about potency and workability as compared to the samples concrete and revealed out the result. With the addition of marble dust the compressive strength of the concrete has increased.

Saxena Kanan et al (2013) revealed about the Hazardous waste generation & impact on environment in Udaipur Rajasthan. That the slurry produced by marble producing industries & during the survey he had found that the major health problems surveyed by the local residents due to this they are suffering from various health diseases in the marble mining units. He had also evaluated that in the Udaipur about 250 marble processing units were observed and there is no proper dumping store yard for marble waste which affects the biological environment.

S.K. Maanju et al (2013) revealed about the impact of mining industry on environmental Fabric. That Mining Industry has keep on deteriorated the ground water quality in the Rajasthan and these industries becoming day by day the sources of the pollution centers which need to take timely actions at Government level. Ground Water is also getting polluted day by day by effluent generated from mineral wastes and beneficiation processes in the vicinity of mining sites such as: Khetri & Zawar etc.

Jyotish Katare et al (2013) researched about the impacts of different mining dust on the vegetation of District- Balghat, M.P. He reveals that soil pollution due to different mining dust has become a problem. Due to the dust chemical characteristics effects on vegetation and soil. The effects on the rate of photosynthesis, respiration and transpiration due to the types of mining dust because of the range of physical and chemical characteristics and its effects on. The growth rate of the plants in this
surrounding shows a decline in growth performance and yield. Even most of the plant community is altered.

P.K Jain (2013) had researched about the environmental degradation due to the opencast mines in Bundelkhand and Gwalior regions to exploitation of the rocks and minerals, which are non-renewable products of nature, once they are exhausted cannot be grown like forest and plants. Mining and quarrying of rocks are carried out by various agencies in small to large scale. At many places in the study area degradation of environment is seen during the field survey subjected to degeneration of the natural resources, dust generation, pollution of the natural resources and the demolition of aesthetic beauty health and socio-economic impacts are the common hazards. Results are found above the permissible limits as fixed by CPCB.

Er. R.P Singh Kushawah (2014) has evaluated about the efficiently handling of marble waste i.e scientific dumping. As the slurry is having the quantity of water. Therefore the proper procedure of dewatering in filter press and disposal is essential. Hence he made an experiment to make out the maximum possibility to get out the water out from the slurry and slurry be changed in the cakes form. They have evaluated various methods like out right dumping, processed solid waste disposal system & mechanical process. By the above mentioned methods the water is separated out of marble slurry. Cakes of the marble slurry can be easily dumped and economical benefit for us.

Arshad et al (2014) revealed out about the Marble Slurry waste produced by marble industry is left unanimously due to this it causes severe environmental problems. In this study was designed, where the partial replacement of cement with MSW was examined. Replacement of cement with MSW from 0 to 100 % and also its usage as an additive material 10% and 20% by weight of cement. From this study we have found that the 97% of lime (CaO) shows the high contents of primary chemical composition in the MSW. From the analysis it shows that cement in structural concrete can be replaced by MSW up to 7% safely. By the addition of 10% MSW the compressive and splitting tensile strength of concrete was observed
to be increased by 15% and 6%. However, the addition of MSW in concrete increases its slump strength.

R.P Arora et al (2014) studied about that marble powder is a good product for due to the mechanical properties of consistent soil. Different tests were analyzed in Udaipur region. The marble slurry waste generated during the processing of marble can be anticipated as about 10% of the total marble quarried. The different tests were performed like compressive and flexural etc. and concludes that the marble waste can be act as a stabilizer.

Chayan Gupta and Dr. Ravi Kumar Sharma (2014) have showing that the persuade of waste materials such as marble dust, fly ash on the characteristics of black cotton soil. The test has been performed with 0-20% ratio with fly ash, etc. The conclusion that the 15% marble dust is enough to increases the California bearing ratio soaked value up to 200% approximately.

Kamel Al-Zboon and Jehad Al-Zou’ (2014) researched about the possibility of recycling stone cutting slurry in concrete production as a replacement of potable mixing water. They determined the physico-chemical properties of slurry. By the investigation various effects of replacement were studied by measuring identifiable concrete and mortar parameters, such as workability, compressive, tensile and flexural strength for concrete, and compressive, and expansion due to alkali aggregate reaction for mortar. Results revealed an improvement of all concrete by various compositions like 21% flexural strength by 18%, mortar compressive strength by 11%. The values of Slump concrete were reduced by approx 58%.

Parte Shyam Singh (2014) experimented about the effect of marble dust powder on the index properties of black cotton soil. From this study we have concluded that the black-cotton soil is having very poor nutrients supporting capacity and due to the variations in moisture contents there is a large change is seen. Marble dust can also be used as to stabilize the soil and after lab results that marble dust can change the properties of clay soil.
R.P Arora et al (2014) experimented about the marble powder which is an excellent substance for the mechanical stabilization of cohesive soil. Through with the tests when the marble slurry is mixed with soil samples by the different percentage ratio results shows the the addition of marble dust change the soil properties which is also environmental and eco friendly for us.

Dr. Pallavi Mehta & Vinod K. Mehta (2015) had studied about the marble mines in Rajsamand & the main objectives of this study the extent of waste generated at various levels in marble mining & processing, to find out the factors of generation of the waste in the marble industry, to search out the various methods of waste disposal and the problems faced by the mine owners. A survey was conducted at 120 marble mines of the Rajsamand area. The data was analyzed and results were found variably.

Er. R.P Singh Kushawah et al (2015) investigated about the waste of marble slurry can be used as in cement concrete. He determined that only construction industry can consume the marble slurry. Different properties of marble slurry determined in the laboratory the results were found is Sp. Gravity 2.61, Fineness Modulus was found to be 0.91. From the results we can conclude that the utilization of marble slurry in cement concrete by replacing sand is 30 % which shows the equal strength.

Dharma Prakash Sharma et al (2015) had revealed about the marble waste can be used in the highway shoulders in which they had mixed the soil sample was prepared by replacing the natural soil 10% to make it extra expensive afterwards marble dust was added to the sample in the proportion of 0% to 25% and the various tests were performed in which the waste material increase the strength, bearing capacity, grain size distribution. They added that marble dust to the soil reduces the clay contents and thus increases in the percentage of coarser particles.

Er. R.P Singh Kushawah et al (2015) studied about the use of marble slurry which can be use as in finishing work as white wash with lime which is 50 % cheaper. Fineness modulus of marble slurry is 0.91 which allows it to be used for
white washing making fine layer and white color repels heat resulting passive cooling of building.

Ako T. A., Onoduku et al (2015) determined the impacts of the marble quarrying on the surface water at Kwakuti was examined out by analysing the various properties of the water samples received from Kwakuti & environs. Concentrations of heavy metals, cations concentrations, anions concentrations. The values of the physical parameters such as pH, electrical conductivity (EC), TDS were analyzed. Results shown from the five sampled locations at Kwakuti are as follows; arsenic (As) (>0.01mg/l) which conforms to the World Health Organization (WHO) and Standard Organization of Nigerian (SON) standards of 0.01mg/l, cobalt (Co) was not detected in any of the five locations and zinc (Zn) with an average concentration of 0.30mg/l still lies within the allowable limits of 3.0mg/l proposed by the WHO. Most of the heavy metals are below the maximum allowable concentrations of WHO and SON (Standard Organization of Nigerian) except for lead (Pb\(^{2+}\)) which has an average concentration of 0.42mg/l which is higher than the maximum allowable concentration of 0.01mg/l which is higher than the acceptable limits of the WHO and SON. It was accomplished the major contaminants in the surface water at Kwakuti and its environs are Mg\(^{2+}\) and Pb\(^{2+}\). The impacts of lead accumulation on the human health and even this has made the surface water the area is not suitable for the drinking either by humans or animals or even for other agricultural purposes such as irrigation due to high concentrations of Pb\(^{2+}\) and Mg\(^{2+}\) in the water and urgent steps should be taken to provide safe drinking water to the people in Kwakuti area.

Altyug Saygili (2015) had investigated about the utilizing waste marble dust in stabilizing problematic soils. In which he studied in two sections. In which the first section correlates with the shear strength parameters and swelling characteristics, the second sections deals with the micro structural investigation of the improved problematic soils. The ratios which have been examined are 0%, 5%, 10%, 20%, and 30% by weight. Various types of soil properties and marble dust samples were experimented. From the test results it can conclude that addition of marble dust improved the shear strength. An obtained result shows that addition of the marble
dust to the clay samples will reduce the cost of constructing structures on problematic soil.

Prerna Sudan et al (2015) had concluded that marble slurry can enhance the soil fertility to save the environment. She observed that marble waste can be used as a macro & micro nutrients for soil. The analysis which was done to evaluate the composition of marble slurry is XRF. Result of this analysis revealed that 30.52% of calcium, 9.95% of magnesium, 1.57% of iron, 0.09% of phosphorous, 0.05% of potassium and 0.07% of manganese present in it. By the XRF analysis of the marble waste also viewed the presence of ultra micro nutrients and REEs (Rare Earth Elements). It is found to be a significant combination to provide macro and micro nutrients for soil.

Sathiraju V Satyanarayana et al (2015) studied about that the solid waste from marble industry can be converted into food grade calcium carbonate. He observed that solid waste is made into slurry with 30-40% . It is dissolved into dilute HNO₃ and precipitated as CaCO₃ using with Sodium Carbonate. It is a green technology for marble industry.

Gulden Cagin Ulubeylia and Recep Artirb (2015) illustrated about the utilization of marble waste in the production of concrete as an admixture material or aggregate have increasingly become an important concern. Various factors have determined after comparing all the results the marble waste can be used in the production of concrete. Therefore, it was observed that the use of marble waste in the concrete mix as an additional material or cumulative it can improve the properties of the hardened concrete.

Rajesh K .Yadav etal (2015) illustrated about the effects of marble dust on the seed germination in Jaipur. In his research he focused on the different concentrations of marble slurry effluent on plumule, seed germination and radical length fresh and dry weight of plumule and radical of crops. By the study he concluded that the rate of germination of seed and seedling growth observed a gradual decline rate with increase in concentration of the effluent. The most
important thing we observed that the marble slurry effluent did not show any inhibitory effect on the rate of seed germination at low concentration. Seed germinated in higher concentration effluent but survive for the long time.

Muthu Kumar M, Tamilarasan V S (2015) studied about the expansive soils causing major problems. These ranges of soils are having high volume changes as we keep on adding the water. The usual soil stabilization phenomenon are general expansive. Due to shortage of materials, energy and also the high cost of construction operation, there is a need to go for alternate low cost materials. In this study, we studied about the marble dust waste which can be used in the soil stabilizations. The marble powder has very high lime (CaO) content and is reported by many researchers. We have added the marble powder to the expansive soil as 5%, 10% 15%, 20%, 25% and studied the compaction characteristics and strength characteristics. By this analysis or use of the engineering we can enhance the property of the soil to make it more stable.

Gulden Cagin Ulubeyli, Recep Artir (2015) experimented about the use of marble waste in the production of the concrete as a natural aggregate has increasingly become as important concern. In the present study, effect of different usage areas of marble waste on the hardened concrete properties was examined. In this study he revealed about the flexural, compressive, Schmidt surface hardness, and lastly sorptivity co-efficient porosity of the hardened concrete. By comparing all the results, the proposition “the marble waste used in the production of concrete”. From the studied it can conclude that use of marble waste in the concrete as an aggregate is improving the properties of the concrete hardened.

A.H. Gami & N.K Patel (2015) observed that the marble dusts reduced the quality of flora areas Danta, Dist- Banaskantha. In which various species of plants has been selected and various studies has been done on the characteristics of the species has been made Measuring Air Pollution Tolerance Index in various seasons of various sites. An experiment has performed in which Air Pollution Tolerant Index which shows the plant capability to combat the pollutants, more index range are more tolerable to air pollution & can be caused as to mitigate the pollution, species
with low index value show the results with low tolerance and can be indicated levels of pollution.

Maria Angeles Munoz et al (2016) studied about the effects of biochar addition in improving soil physical properties, which are mainly not clearly understood in mine tailings. In this study he has determined the 3 different types of biochars, in addition to Marble Mud (MM) and their mixtures with the structural stability & water retention of mine wastes in Cartagena, Spain. Biochars were added at 500°C from Pig Manure (PM), Crop Residues, Cotton residues and municipal solid waste management. Biochars were added to the mine waste along with MM without any control. These mixtures were stored in cores for 90 days .Pig Manure and Crop Residues mixed with MM decreased soil bulk density. Results shown that that there is no significant effect on the total porosity whereas the gas diffusion increased by 100% except for MSW.

Sachin P. Chakolkar et al (2016) studied out that marble slurry is one of the toxic waste which destroys the environment in which they suggested that marble slurry powder can be used as an concrete by replacing sand with different proportion of marble waste .The compressive, tensile test has been performed.It shows that the M25 grade cement can be used as an concrete in the sector.By this process we can save the environment.

Shams Ul Khaliq et al (2016) researched out that use of marble powder in concrete. Different properties have been tested compressive, tensile etc.Concrete samples have been analyzed with the different proportions of marble powder results concluded that marble can be used in cement as a concrete production.

Er. R.P Singh Kushwah and Dr. Om Prakash (2016) analysed that marble slurry can be use in the construction sector for this test has been performed like fineness, gravity etc in which it concluded that marble slurry can be used as in the place of sand and can mix with cement.

R. Zornoza et al (2016) perform an experiment in which reclaim the land by microbial growth. Soil quality can be improved by the use of microorganisms.
Different experiment has been taken pig slurry, manure pic and PCM applied with marble waste and without marble waste. Organic compounds shall be used to reclaim the land by microbial populations.

Sudharshan D. Kore & A.K Vyas (2016) studied out the use of marble waste as an aggregate in concrete. Coarse Aggregate was replaced by marble aggregate with the different percentages. The concrete mix with marble aggregates was more than that of normal concrete. The compressive strength in which marble dust has been mixed increased.

Dhiraj Mehta et al (2016) researched out the preparation of adsorbent and removal of fluoride ions by adding marble waste. By the X-ray diffraction method electroscopy, etc test have been performed. Result shows that marble waste powder is act like an adsorbent by reducing excess fluoride ions called as deflouridation.

Manpreet Singh et al (2016) observed that tons of marble waste has been generated. Marble slurry can be use as brick production. Various experiments has been performed that marble slurry containing brick is much cheaper than the normal brick and reduced the environmental hazards also and promotes the low cost housing also.

Shivam Mittal et al (2016) researched out the marble dust can be used as replacement of fine sand. Marble dust replace by percentage and experiment has been performed in which increase the structural, compressive and flexural strength etc. Marble waste increases the hardened concrete production.

Jay P. Chotaliya et al (2016) investigated that the marble chips can be used as a concrete aggregate in which tests have been performed like compressive strength, flexural test. Results shows that marble chips can be use as a concrete and reduce the environmental damage.

Aditya Rana et al (2016) experimented that by river sand aggregate replace by marble slurry. It shows the extreme strength, compressive, permeability etc. The use of marble slurry shows the sustainable development in the sector.
Wisal Shah and Muhammad Nafees (2016) studied that various uses of marble slurry in the different sector and can be used in the other products also. Differents test have been performed like X-ray fluorescence, dried the sludge. It shows by chemical analysis that the CaO is the maximum composition which can be act like a binder in other industry.

Dina M. Sadek et al (2016) investigates the marble waste powder, granite powder, and mixed powder can be used as an additive in self compacting concrete. Test has been conducted J-test slump test, water adsorption etc. By the addition of 50% can be used as an mineral additive. Granite powder shows the better result than marble powder.

Manpreet Singh et al (2016) described various chemical properties of marble dust like X-Ray Diffraction, Thermo Gravimetric Analysis etc and studied the chemical reaction. By which marble dust can be used as a construction material.

Marinela Barbuta et al (2016) experimented out that marble waste can be used an obtaining epoxy polymer concrete. Test have been performed with marble powder and marble waste like compressive, flexural, tensile etc. data was analyzed with SEM images. Marble powder shows the high mechanical properties.

Kursat Esat Alyamac et al (2016) researched out by using response surface methodology making out the ecofriendly concrete. The tests like slump test V-funnel etc has been performed By this eco-efficient SCC was obtained.

Er. R.P. Singh Kushwah et al (2016) experimented that due to the use of marble paste can be used as a coolant in the building. For this various parameters have been tested like the temperature, fineness etc. By the results it shows that due to the marble paste it reduces the temperature in respect of other material.

Hasan Sahan Arel (2016) researched out that the cement can be replace by marble. The marble powder increases the compressive strength and tensile strength, it increase the mechanical properties of concrete. Use of marble powder in cement industry decreasing the CO$_2$ level and which is also economically benefit for us.
Saliha Elabbas et al (2016) researched out the eggshell and marble powder to remove the chromium ions from the waste water. Chemical characteristics has been conducted. The Langmuir isotherm showed the interaction of chromium. Marble powder adsorb a faster rate of chromium. Marble powder can be used a low cost material to remove chromium.

RP Arora et al (2016) investigated that marble slurry can be used for the road formation. Samples were collected from different location for soil and marble slurry. Soil and marble samples were mixed with different ratios. Various tests have been performed like compressive, tensile etc.

Dharma Prakash Sharma and Dr. S.K Singhal (2017) researched out about the unsystematic mining activities. The radioactive materials destroys the vegetation. Samples collected from Jaipur District Slurry contains CaCO$_3$ particles which affects the human health. Use of the marble slurry in the soil reduce the minute particles and increase the coarse particles.

Zdenek Prosek et al (2017) replacement of the cement by the marble for this experiments have been conducted like flexural, compressive, tensile, shear modulus and elasticity. It shows the the increased compressive strength with marble powder which is also eco-friendly and economical benefit for us.

Fabian Moreno-Barriga et al (2017) performed an experiment. In which decrease the Cd, Zn in the technosols. Marble sludge was added to metal immobilization because of the higher calcium carbonate. Results of biochar showed the interactive results with calcium, iron oxides etc.

Hemant Agrawal and Dr. Bharat Nagar (2017) experimented out that different raw materials can be used as concrete at cheap cost like fly ash, rice husk, and marble slurry etc. Marble slurry was replaced by cement with different percentage and different experiments have been performed that marble slurry can uses as a concrete material.
Jharna Gupta et al (2017) researched out that catalyst from marble slurry for the production of biodiesel production. By the different test methods like titration, diffraction etc. results show that marble slurry act as a catalyst for biodiesel production.

Manpreet Singh et al (2017) analyzing that replace the cement by the marble slurry. Different experiments have been performed like the flexural strength, abrasion, tensile etc. By the partial replacement marble slurry can be used as cement which helps in the environmental degradation.

Vandana Lal (2017) presented a paper on the in which government allotted the land for marble slurry dumping yard in Kishangarh day by day the number of visitors have been increase for the beautiful sight seeing. Dumping yard is can be convert into picnic spot but on the other side the garden also affects the natural environment vigorously.

Er. Gokul Prasadsharma and Dr D.K. Singhal (2017) performed a methodology experiment in which replaces the marble powder by different percentage. The strength has increased of 15% marble dust. Marble Slurry can be used in the concrete form also and save the environment by these environmental hazards.

G V Vigneshpandian et al (2017) investigates about the strength properties of concrete in which marble dust replace of fine aggregates. By the adding different percentage of marble slurry and performed the experiment. By the experiment it shows that marble dust can be used as a replacement of fine aggregate. It increase the structural, flexural etc strength in concrete.

R.P Singh and Arvind Singh Gaur (2017) experimented with different percentage. 25% replacement increase the compressive strength. Results shows that marble slurry can be used as a substituent instead of natural sand and it can save the problem of dumping slurry waste.

Dhruv Saxena (2017) presents the paper on the marble powder affects and various experiments have been performed by the shear strength California ratio etc.
clay soil was mixed with sand and marble powder. Various parameters have been increased due to the addition of marble powder. Marble powder can be used for increased the strengthening and save the construction cost.

Manpreet Singh et al (2017) performed an experiment replace the cement by two ratios 0.40 and 0.45. Test is performed for compressive, flexural and tensile strength. It shows the density increases with the marble slurry. Marble slurry is a cheap method of replacement of cement.

Puneet Jain & Dr. S.S Sankhla (2017) performed an experiment regarding the replacement of sand with the marble slurry powder. In which concrete replace with marble powder. M20 cement is good for RCC work in the construction section and it can save the environment from the natural hazards also.

Rajendra Kumar Khyaliya et al (2017) evaluated that marble powder can be used in mortar mixes. By the replacement of river sand 25% and 50% by marble powder can reduced the water requirement and compressive strength. Its results that marble waste powder can be used as an substitute instead of river sand.

A.S.E. Belaidi et al (2017) investigated the effect of marble powder on cement. The cement was replaced by different percentage with marble powder and tests have been performed like sieve stability tests etc. the addition of 40% of marble powder shows the maximum strength.

Shivendra Singh Kushwah and Shilpi Gupta (2017) experimented that marble slurry can be use for the soil stabilization. By the different test methods like x-ray diffraction, compaction etc and the various mixtures of marble slurry and lime stone have been examined. In the construction sector and road we can use marble slurry as a good binder.

Parveen Berwal & Dr. Rajesh Goel (2017) performed an experiment regarding the replacement of the cement from the marble slurry powder in which different test have been performed tensile, compressive, and flexural. Results shows the different chemical properties of the marble powder can replace the cement. Marble powder
can be use in the construction which can saves the environment from the degradation. The use of marble powder in the construction sector is very economical for us.

Krishan Kumar & Sumesh Jain (2017) investigated the replacement of the steel fibres with the marble dust for this tests have been experimented the marble powder shows the result 1% which shows the good flexural, tensile and compressive strength. By the replacement of the cement with marble dust from 0.5 to 1% and addition of steel fibres is best for design of pavement quality concrete.

Dr. Shailesh Chaudhary & Mr. Om Prakash Singh (2018) investigated about the use of marble and granite slurry in clay bricks. Various tests have performed regarding the density and water absorption. Replacement of clay with slurry (10%) increase the compressive strength. But after 15% its gets start decreasing due to the water adsorption.

Mahipal Singh Sankhla et al (2018) experimented out that marble slurry powder can be used as a fingerprint development on the permeable and non-permeable substance. Marble slurry get mixed with the fatty acid & sweat of finger. It gives the clear fingerprint pattern. This development is useful in crime investigations.

Mariano Simon et al (2018) aim to analyze the affects of the sludge on the topsoil regarding this performed an experiment in which marble sludge and topsoil. The organic carbon in the soil is higher and the soil is not as per the equilibrium. Addition of marble sludge promotes the root growth it acts like a contact zone.

Shruti Bhagave & Kishan Lal Jain (2018) performed an experiment by replacing sand with marble slurry and glass powder. By this like compressive, tensile and density test have been performed. Results show the good strength with marble slurry. That marble slurry can be used in place of sand by replacing the fine aggregate.