

INTERNATIONAL CONFERENCE ON **MOUNTAINS IN THE CHANGING WORLD**

OCTOBER 27-28, 2017 KATHMANDU, NEPAL

CONFIRMATION OF PARTICIPATION & PRESENTATION

Mohammad Farzam

I confirm your participation in the International Conference on 'Mountains in the Changing World (MoChWo)' at Grand Hotel in Kathmandu, Nepal, October 27-28, 2017. The theme of the conference was "Air Pollution, Mechanisms and Consequences".

I acknowledge your poster presentation on "*Spiny and allelopathic shrubs conserve 40 percent of species richness in Binalud Mountain Iran.*"

Thank you for accepting our invitation.

THE SECOND INTERNATIONAL CONFERENCE ON
MOUNTAINS IN THE CHANGING WORLD
October 27-28, 2017, Radisson Hotel, Kathmandu, Nepal

Air Pollution: Mechanisms and Consequences



Dr. Basant Giri, Convener
October 28, 2017



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Air Pollution: Mechanisms and Consequences



CONFERENCE PROGRAM & ABSTRACT



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potential microbes used in seed bio-priming and methods being followed is also reviewed proposing bio-priming as a promising technique for application of beneficial microbes to the seed.

Keywords: bio-priming, antagonist, bio-control, induced systemic resistance

Application of urease utilizing microbes to solve the dust problem of Kathmandu municipality (PO - PO -1 - 91)

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Road dust is composed of mud/dirt/sand and its emissions originate by wind blowing and vehicle driving on such loose material. Hence, in order to overcome this result, method of bio-mineralization can be used effectively. Application of urease producing microbes addresses these problems as they can survive and grow in dust after the initial use with the addition of urea and calcium chloride externally. Urease helps in mineralization of calcium carbonate by hydrolyzing added urea and using added calcium chloride. Produced calcium carbonate helps for bio-clogging of dust making it difficult to get blown. Microbes isolated from sewage and construction site samples is tested for urea hydrolyzing capacities. Urease positive bacteria is used to bio-cement the dust in-vitro by incubating it for one week. The fine dust is found harder and heavier to get blown the presence of calcium carbonate is tested using Acid test. This method is eco-friendly alternative approach to convention and current remediation technology to solve the dust problem.

Keywords: urease, microbes, mineralization

Characterisation of leachate and its impact on the quality of ground water Nnearby lanadfill sites of Kathmandu valley (PO -PO -1 -104)

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The landfill site leachate contains many hazardous chemicals and may impact nearby water sources. In this work, we studied physicochemical characteristics of leachate and surface water samples collected from Sisdol landfill site (current landfill site), Gokarna landfill site (closed landfill site) and Sundarighat river corridor (former dump). Composite samples were collected from each of the study area every two weeks. We measured pH, Cl⁻, TDS, TSS, total hardness, total alkalinity, BOD, COD, total ammonia, nitrate, inorganic phosphate and metals. High values of BOD, COD, Cl⁻, alkalinity and TDS were recorded from all three landfill sites. Most of the parameters exceeded the guideline value given by WHO, NDWQS, and Nepal Water Quality Guidelines for Irrigation Water and Aquaculture.

Keywords: solid waste, dumping site, surface water, leachate, water quality index

Development of paper-based analytical device for heavy metal analysis of leachate samples from landfill sites of Bagmati zone, Nepal (PO-PO-1-125)

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Currently in Nepal, there is lack of provision regarding separate handling of hazardous waste containing heavy metals. Such situation has increased the probability of heavy metals leaching into the surrounding groundwater and soil. Various studies have been conducted to detect and quantify heavy metals in groundwater and soil, with all showing exceeding levels of concentration than the standard limit which is implicating threat to public health and environment. Heavy metals are generally measured using atomic absorption spectrometer which requires expensive equipment and trained personnel. There is a need for a simple, low-cost and portable method. In this research, we aimed to develop microfluidic paper-based analytical devices using Whatman grade 1 filter paper and wax crayons. The deposited wax was later heated to form a hydrophobic barrier on the paper device. Within the barrier, the detection reagents of given metal react with the heavy metals to produce their respective color. We used visual detection using eyes for qualitative results. For quantitative results, we imaged the paper device and analyzed on ImageJ software. The custom built paper device was used to generate a response curve for nickel and iron with a calibration range of 100-1.56 mg/ml. The curves were used to measure the metals in leachate samples collected from Sisdol, Gokarna and Sundarighat. The nickel could not be quantified as it was below detection level of paper device but, the samples showed to consist a maximum of 1.09 ± 0.02 mg/ml to a minimum of 0.49 ± 0.01 mg/ml of iron.

Keywords: Paper-based analytical device, leachate, microfluidics, heavy metals, smartphone, ImageJ

Spiny and allelopathic shrubs conserve 40 percent of species richness in Binalud Mountain Iran (PO-PO-1-144)

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Iran is a mountainous country; about 50% of the country is consisted of high mountains. In many mountainous rangelands of Iran, plants are simultaneously under high pressure of livestock grazing (biotic stress) and harsh montane climate (abiotic stress). Under such conditions, nursing effects of shrubs can play a critical role on conserving the species diversity and richness. A study was conducted in northern slopes of Binalud Mountain, in northeast Iran. Facilitation effects of an allelopathic shrub (*Artemisia turkestanica*) and a spiny shrub (*Astragalus gossypinus*) were studied on other plant species. Plant sampling was conducted within 300 quadrates, taken from 5 different sites; 75 quadrates under canopy of *Astragalus* and 75 for *Artemisia* and 150 in the adjacent open areas of each shrub. Flexible plots, with the same size of shrub canopies, for both *Astragalus* and *Artemisia* and their adjacent open areas. A total of 50 plant species were identified, from which 41 were growing under canopy of *Artemisia*, 24 under *Astragalus* and 28 in open areas. Some (30) species were common between the microsites, 8 species were exclusively growing under canopy of *Artemisia*, 4 under *Astragalus* and 8 species were common under canopy of *Artemisia* and *Astragalus*. In conclusion, our results indicate importance of spiny and allelopathic shrubs for conserving species richness in the mountainous rangelands. Although these species are usually known as invasive or expansive species, but without their nursing effect, about 40% of the flora of Binalud Mountain may be vanished due to biotic and abiotic stresses.

Keywords: abiotic stress, biotic stress, allelopathic, livestock, diversity

Livelihood improvement of indigenous Tharu community through Riverbed Vegetable Farming: Evidences from Kanchanpur District, Nepal (PO -PO -1 -148)

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Vast tracks of riverbeds in terai region of Nepal, which are fertile but fallow, can be utilized for vegetable production in dry season. About 8000 ha of riverbed land can be used for farming in Terai region of Far-Western Nepal. This study was conducted to find out overall farming scenario and assess the contribution of riverbed vegetable farming in annual household income of commercial riverbed vegetable farmers of Kanchanpur district. Two Tharu communities, Banara (in the banks of Banara River) and Rajghat (in the banks of Mohana River) were purposively selected being the major riverbed vegetable farming localities of the district. A total of 60 farmers, 30 from each village, were randomly selected and surveyed with a semi-structured questionnaire. Focus Group Discussions with key farmers were carried out along with the participation of local extension workers. The data entered and analyzed using MS-Excel and SPSS Software. The average area of riverbed under cultivation and gross income from riverbed vegetable farming was found to be 0.22 ha and NRs. 694291.03 ha⁻¹ respectively. Its contribution in annual household income was 39%. Income from riverbed vegetable farming can be substantially increased by providing subsidies in inputs, Integrated Pest Management trainings, crop insurance and controlling postharvest losses. The livelihood of landless and land-poor indigenous Tharu community can be sustainably improved by effective extension of riverbed vegetable farming technology.

Keywords: riverbed vegetable farming, indigenous Tharu community, livelihood improvement

Study of zero tillage demonstration on farm trial (PO -PO -1 -157)

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On farm a trial was conducted in split plot design in 4 district of Nepal (Mahottari, Nawalparasi, Dang and Bardiya) in 2015 to study the economic analysis of the zero tillage wheat. Terminal heat stress was a major key factor for the low yield of the wheat. As the zero tillage is a proven technology for the escaping of the terminal heat stress. Treatments were design combing different production scenarios i.e. reduced/zero tillage, residue retention, precision nutrient management using leaf color chart, sprinkle irrigation method and intercropping practices. As the sowing date was same in all the treatment, so there was no significant difference in the yield and bio mass production among the treatment. However, there was significant difference in the cost of production and profit among the treatment. Similarly, there was no any benefit in the precision fertilizer use, irrigation method. The intercropping of garlic and legume were unprofitable than solo- wheat cropping. However, the residue retention was found to be profitable and zero tillage and reduced tillage were found to be profitable. In case of the scenario, S₄ (NRs. 94,224 ha⁻¹) S₂ (NRs. 96,541 ha⁻¹) were found to be more profitable as compare to the S₁ (NRs. 79,741). We can conclude that the zero tillage and residue retentions seems more profitable than other tested cultivation practices. As being the eco-friendly, residue retention and zero tillage should be scale up in large extent with preparation of proper guidelines and policies.