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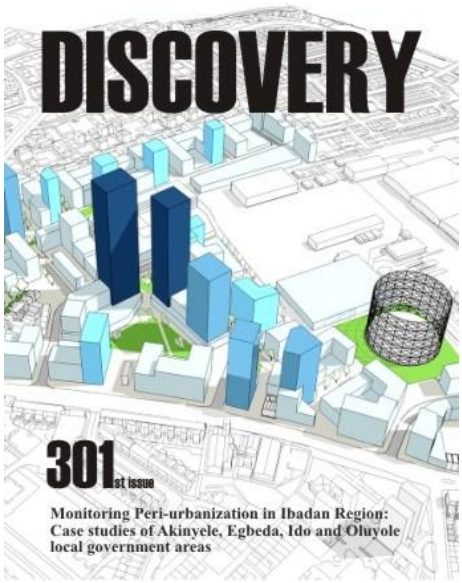
DISCOVERY

About the Cover



This study analyzed the magnitude and patterns of urban expansion (built-up area) in Ibadan peri-urban areas (Akinyele, Egbeda, Ido and Oluyole Local Government Areas) between 1986 to 2019 using Landsat-5 (TM) and Landsat-8 (OLI/TIRS) images. Across the study areas, our results, on the one hand, show an increase in the built-up area, rock and bare soil, and grassland area, while, on the other hand, they reveal a decrease in forest and open space over the study period. Respectively, the built-up area increased by 306.34%, 317.16%, 243.66% and 400.80% in Akinyele, Ido, Egbeda and Oluyole Local Government Areas. Having established built-up expansion in Ibadan peri-urban areas, this study; however, recommends that comprehensive planning focus on the peri-urban areas is required to arrest urban sprawl and its corresponding adverse impacts. (Ref: Kolade Victor Otokiti, Apolola Ayoola Collins, Ayomide Samuel Famewo, Rukayat Tolase Raheem. Monitoring Peri-urbanization in Ibadan Region: Case studies of Akinyele, Egbeda, Ido and Oluyole local government areas. *Discovery*, 2021, 57(301), 74-85).

SOCIAL SCIENCE

Analyzing the form and shape of Brazier since 3000 BC to 330 BC

Melika Rahmatian, Bita Sodaei

Fire has been one of the greatest and most important discoveries of the mankind in ancient times which has changed the human life in different aspects and has brought him evolution and dynamism. Moreover, throughout the history, it protects human from theria and enemies and has provided him security and peace. Human always looked at the fire as an extraordinary phenomenon which was sacred and respectable. By investigating the relief of the brazier in the reliefs and seals of the ancient periods, the tangible and undeniable position of fire can be understood. Purpose of this scientific research was to analyze and investigate various forms of braziers used in religious and nonreligious ceremonies from 3000 BC to 330 BC. By investigating the form and shape of brazier, it was concluded that shape of the braziers has been changed during this period of time and on the other hand influence of ancient ritual on Zoroastrian religion can be realized. The braziers have been classified in terms of their form and shape into six categories: 1. censer; 2. terrestrial; 3. cubic; 4. stepped; 5. columnar; 6. Stratified. Moreover, the above mentioned braziers have been analyzed in terms of their subject. The investigations indicated that brazier and censer have been used respectively in religious levee ceremony and nonreligious levee ceremony.

Discovery, 2021, 57(301), 1-24

SCIENCE

Studies on the incidence behavior and morphometry of Hilsa Fish, *Tenualosa ilisha* in relation to environmental attributes in the selected portion of the upper stretch of Hooghly estuary

Tarit Kumar Banerjee, Uday Shankar Hazra, Ritabrata Banerjee

The Hooghly estuary, a distributary of Ganga-Bhagirathi River, located within the state of West Bengal, India, spanning across about 0.8 million ha is a positive estuary of mixohaline nature. The estuarine system lies between latitude 21 - 23^0N and longitude 88-89^0E. The Hooghly estuarine system is highly productive, since it receives substantial quantities of silt load and nutrients along with huge fresh water from Ganga. During tidal period significant amount of nutrients enter into the main channel and its tributaries making the entire system highly productive. There have been several studies on the pollution in the estuary has a thickly populated urban and highly industrialized centers of hinterland. These centers generated domestic and municipal sewage and industrial effluents, which find their way into the sea. The agricultural runoff also add to the pollution load. These are a number of small and large industries on the banks of the river Hooghly. The industries which may cause pollution from point sources include paper, textiles, chemicals, pharmaceuticals, plastics, shellac, food, leather, jute, pesticides, oil etc. The studies have revealed that domestic/municipal sewage contribute maximum (68.95%) pollution to the estuary. The impact of pollution on biota was seen at short distance below the on fall but overall there has been a poor biological quality of the estuary near industries indicating a general deterioration in the ecological conditions. Heavy metals are the normal constituents in marine and estuarine environment. Pollution of Hooghly estuary with trace metals has been on the rise. Sedentary organisms are adversely attacked by the trace metal pollution. Dictated by market value and popular preference, *Tenualosa ilisha* (Hilsa fish) ranks as the prime fish and commercially the most important fishery of the estuary. The monsoon (July - October) is earmarked as the main season for hilsa fishery, as the fish from the in shore areas of the sea ascends upstream mainly for spawning seeking fresh water stretches of the estuary. The low yield of hilsa in present day situation has arrived a question to find out the factors. In this regard factors like indiscriminate killing of juveniles, establishment of Farakha Barrage, decreasing depth of estuary, pollution state etc have been mentioned by different workers. Serampore - Uttarpara belt is famous for hilsa landing but no report from this area is available. Hence the work has under taken. From Bally to Serampore, five stations (Bally, Uttarpara, Konnagar, Serampore and Ariadaha) have been selected. Physico-chemical natures of water and soil have been observed in each month round the year (2010). At the same time hilsa catch in different stations has also been recorded. Morphometric analysis of these fishes has also been worked out. From the observed data on hilsa fish catch it appears that in monsoon period (July to September) maximum hilsa fishes were caught during August and the majority of the fishes were 500 - 800 kg in weight. The range of average length and breadth were 24.62 to 27.36 cm (standard length 27.53 to 30.64 cm) and 7.16 to 9.06 cm (standard breadth 8.75 to 12.68 cm) respectively. These denote reduction of weight and size (Length and Breadth) of hilsa fishes in the estuary. Further, it has been seen that during 2005 the annual catch was observed as 90.25 kg/boat/station and within five years (2005-2010) the catch amount has been reduced to 41.50%. During the present study no adult fishes of 1.5 kg in weight were seen but during 2005 hilsa fishes bearing the same weight were observed in the estuary. During winter incidence (January to March) juvenile hilsa catch is also observed in low quantity. These indicate that hilsa fishes find inconvenience in migration to the estuary. The observed on the Physico-chemical parameters of water and soil reveals that dissolved oxygen content of water appears as 5.88 mgl^{-1} is not favorable for the growth of hilsa fish. Other parameters are not unfavorable for aquatic animals. Among the soil parameters available phosphorus (average 3.92mg/100gm), organic carbon (average 0.81 %) and heavy metals like zinc (average 55.28mg/100gm) and lead (average 28.00 mg/100gm) are marked relatively high. The total hydro-pedagogical conditions denote the pollution state of the water body in the estuary and adverse for growth and reproduction of hilsa fishes. Heavy metal pollution is detrimental to fish reproduction. Probably the pollution state leads to the uncongenial condition for the migration and reproduction of hilsa fishes. Perhaps for these reasons hilsa fishes move in another route leaving the pathway of Hooghly estuary. Present findings

strongly demand the execution of immediate monitoring and control measures to protect the estuary enabling the steady migration of hilsa fishes as happened in ten or twenty years back.

Discovery, 2021, 57(301), 25-55

Ontogeny, tissue specificity and mRNA expression changes in angiotensinogen gene upon *Aeromonas hydrophila* infection in *Puntius sarana*

Das A, Sahoo PK

Angiotensinogen (AGT), an acute phase protein and its expression increases during inflammation. Being a constituent of Renin-Angiotensin System (RAS), AGT helps in vascular permeability, leukocyte infiltration and tissue proliferation. A partial mRNA encoding AGT gene was cloned and sequenced from the liver tissues of medium carp, olive barb *Puntius sarana* and a nucleotide sequence of 350 bp encoding 116 deduced amino acids was generated. The AGT sequences are highly conserved in fishes and the *P. sarana* AGT showed 80% and 88% similarity to *Danio rerio* AGT gene at the nucleotide and amino acid level, respectively. The distribution of the AGT transcripts in major tissues were analysed by RT-PCR and revealed the constitutive expression in brain, gill, muscle, intestine, spleen, skin and liver. The highest level of expression was marked in liver, however, the absence of the AGT transcript was noticed in anterior kidney and heart. The AGT mRNA was detected from unfertilised eggs to 21 days post fertilisation onwards indicating maternal transfer of transcripts, in *P. sarana*. Further, AGT expression level in liver of *Aeromonas hydrophila* challenged and healthy control *P. sarana* was analysed and a significant increase in expression was noticed at 1 to 12 h and again at 7 and 14 days post challenge. The current investigation further suggests the association of AGTs with bacterial infection and it is the first report on ontogeny study of this gene.

Discovery, 2021, 57(301), 56-62

SOCIAL SCIENCE

Potentials of information and communication technology in real estate management and valuation practice

Mohammed JK, Bello MZ

Technological advancement with globalization and increasing urbanization necessitated transition in real estate practice. Consequently, information and communication technology (ICT), including application software, geographic information system, drone technology, wireless sensor networks, cloud computing, artificial intelligence and the Internet of Things (IoT) have become common and emerging tools for estate surveyors and valuers to achieve value addition in real estate practice. These technological innovations are among the most sophisticated in both built and business environments ona global scale. Their adoption affects both employers and employees in both the public and private sectors. The increasing complexity of real estate management and valuation practice requires these technologies to remain competitive in the global economy. Although there are studies on ICT applications in real estate practice they are mostly on software applications, while those on sensor, drone, IoT, big data, and artificial intelligence are industrial based, and motivated by profit maximisation without considering the impact of these technologies on stakeholders and the community. Therefore, there is a scarcity of scholarly studies that evaluate the current trend of technological innovation in real estate practice as it affects employers and employees and also considering privacy issues. This study essentially relies on published data sourced from academic journals, conference papers, thesis, and other secondary sources. The paper explores technological innovations for sustainable real estate practice and therefore recommends what it regards as the most appropriate technologies for various aspects of real estate.

Discovery, 2021, 57(301), 63-73

Monitoring Peri-urbanization in Ibadan Region: Case studies of Akinyele, Egbeda, Ido and Oluyole local government areas

Kolade Victor Otokiti, Apolola Ayoola Collins, Ayomide Samuel Famewo, Rukayat Tolase Raheem

This study analyzed the magnitude and patterns of urban expansion (built-up area) in Ibadan peri-urban areas (Akinyele, Egbeda, Ido and Oluyole Local Government Areas) between 1986 to 2019 using Landsat-5 (TM) and Landsat-8 (OLI/TIRS) images. Across the study areas, our results, on the one hand, show an increase in the built-up area, rock and bare soil, and grassland area, while, on the other hand, they reveal a decrease in forest and open space over the study period. Respectively, the built-up area increased by 306.34%, 317.16%, 243.66% and 400.80% in Akinyele, Ido, Egbeda and Oluyole Local Government Areas. Having established built-up expansion in Ibadan peri-urban areas, this study; however, recommends that comprehensive planning focus on the peri-urban areas is required to arrest urban sprawl and its corresponding adverse impacts.

Discovery, 2021, 57(301), 74-85

SCIENCE

Proximate analysis of Coconut (*Cocos nucifera*) endocarp

Chuku LC, Matthias Onikio M

The proximate composition of three different coconut endocarp samples was investigated. Coconut (*Cocos nucifera*) endocarp was observed to have high percentage of lipid (51.83%) than other nutritional contents analyzed in the proximate composition. Moisture

content was (36.86%), fibre (12.85%), carbohydrate (9.76%), protein (6.93) and ash (1.75%). The proximate composition of coconut endocarp was investigated. The result aims at elucidating the proximate composition studied so far with regards environmental variations as no work of such has been done in the study area or environment.

Discovery, 2021, 57(301), 86-89

TECHNOLOGY

Biotechnological synthesis of silver nanoparticles of *Indigofera aspalathoids* leaf extract

Krishnasamy L, Jayanthi K, Ponmurugan P

Nanotechnology is gaining much importance in the current century because of its capability of modulating metals into their nano-size. The present study deals with the synthesis of silver nanoparticles using the *Indigofera aspalathoids* leaf extract. The complete reduction of silver ions was observed after 48 h of reaction at 30° C under shaking condition. The color changes in reaction mixture (watery to dark brown color) was observed during the incubation period, because of the formation of silver nanoparticles in the reaction mixture enables to produce particular color due to their specific properties. The synthesized nanoparticles are confirmed by color changes and it was characterized by UV- spectroscopy, FTIR and SEM studies.

Discovery, 2021, 57(301), 90-94

Degradation of Azo dyes by immobilized *Pseudomonas aeruginosa* and *Bacillus subtilis*

Illanjiam S, Kantha D Arunachalam

Immobilized *Pseudomonas aeruginosa* and *Bacillus subtilis* are able to reduce azo group enzymatically and are used as a biocatalyst for the decolorization of waste water containing azo dyes. Cells of *Pseudomonas aeruginosa* and *Bacillus subtilis* were immobilized by entrapment in natural and synthetic polymerized matrices. Immobilized cells were less sensitive to agitation rates (dissolved oxygen levels) and pH. The time required for 50% conversion (t1/2) remained nearly the same for CGN- and PAA- immobilized cells during four cycles including the stable decolonization efficiency of these immobilized cells.

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