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Study of the Effects Due To Eutrophication and Chemical Pesticides in JAMUAARI River Samastipur North Bihar

Ghooran Mahto, Research Scholar, Lalit Narayan Mithila University, Darbhanga, Bihar, sciensika@gmail.com

ABSTRACT

Present Study was to find out biodiversity status of River Jamuaari and evaluate several effects of herbicide spraying in the river basin. The main objective of this study was to monitored lose of the biodiversity and current land-use activities in Jamuaari river basin and their impacts on the nutrient load in river ecosystem. In India, many researchers have worked on physico-chemical study of rivers (Chaturvedi, 2006) and toxicity of Glyphosate herbicide. Recently scientists have found harmful effects of pesticides on living being (Mose et al; 2008, Gasnier et al; 2009) e.g. cancer, geno-toxicity, endocrine disruption, reproduction. Some research work on the immunological study of river (Kumar & Sinha, 2005), but Nocomplete Physico-chemically, Ecologically and zoo geographically work done prier and tributary basin of Jamuaari river in Sarairanjan block of south Samastipur has not been investigated such manner till now. So this research work was performed. Total five year Phosphate and bicarbonate concentration was the main determinant of the nutrient loads/productivity, and ranged between 30/1 and 90/5 of the total five year change. Five-year water and soil samples confirmed that eutrophication increased with increasing herbicide use, with significant differences between biodiversity of tributary basin and far most sampling sites. The seasonal phosphate and bicarbonate concentration change, were highest in tributary basin (65/5.3,60/3.7,15/1.8, site I, site II and site III), mainly site I as compared to far most region of river bank (5/2.2,5/1.4,5/5.5, site IV, site V and site VI).Within five year phosphate and bicarbonate concentration change, were highest in tributary basin(35/0.2,25/1.6,20/0, site I, site II and site III) mainly site l as compared to far most region of river bank(5/0.4,0/0,5/1.4, site IV, site V and site VI) also. The lose of distribution of flora and fauna species as a function of ecosystem has also showed significant differences in the basin as the biodiversity status (rate of biodiversity index change) of the tributary basin(0.970203/0.9577415,0.902464/0.96670685,0.873959/0.855363,0.923783/0.904027,0.888889/0.829861,0.761707/0.598338,0.5/0.444444,0.64/0.5,0.716049/0.573973,0.983740904/0.951004897 Fish, Bird, Mammal , Insect, Reptile, Molluscs, Annelida, Amphibian, Non flower and Flowering plant's Simpson Index respectively in 2011 and 2015 in the Tributary basin and 0.8887126/0.88871801,0.746667/0.746775,−6.02032225/0.910147599,0.833333/0.833333, 0.5/0.5, 0.5/0.5, 0.64/0.639003, 0.444444/0.44213,−4.13972/0.031191Fish, Bird, Mammal, Insect, Reptile, Molluscs, Annelida, Amphibian, Non flower and Flowering plant's Simpson Index respectively in 2011 and 2015 in Balan floodplains).Zoogeography of Basin has also differed within ten years (DUBAILA wetland converted into cropland).Due to continuous garbage deposition river bed had filled up and at last river changes their water course and take a new topographic forms-

(i) Creation and degradation of river .chhoti Jamuaari, Budhi gandak.
(ii) Creation and degradation of pond and lake .Dhobghatta, Baraila.
(iii) Creation and degradation of green wetland and forest .Dubaila, Madhuban As a result of habitat change, composition of species had changed also: Bird- Vulture, MAHOKHA extinct, and falcon endangered. Fish- ARANGA, CHACHARA, BUNNA extinct, LATKUN, and CHELVA endangered. Invertebrates- Holy snell (sankh), Bivalve extinct, pila endangered Aquatic plant- CHARA extinct, KARMI endangered. Terrestrial plant- BRAHMI extinct, BATHUAA, TETARI endangered. Biochemical analysis and physical observation suggest that river system has effected by speedy eutrophication due to Glyphosate herbicide.

Keyword: Dual nature pesticides, Cultural eutrophication by herbicide, Aquatic zoogeography of Jamuaari River.

1. INTRODUCTION: GENERAL CONCEPT

It is a concern about agriculture management practice that seeks to conserve, protect and restore habitat areas for wild plants and animals, especially conservation aquatic and aquatic dependent species, and prevent their extinction and reduction in range. This research work is not concerned toxicity aspect; it is zoogeographical point of view. Eutrophication is a major factor of hydric succession. In a natural way, it is the cause of species change over times in an ecosystem. Every ecosystem has capable of self-controlled and self-balanced feedback. Since man interferes in the natural process by many activities, such as agricultural inputs. However, the main purpose is to produce more food. Hence, man provides extra nutrients and other materials in the ecosystem. Bacteria and fungi, decompose it and nutrient minerals are released. The nutrient contents of the system increase. These nutrients rich condition supports phytoplankton to over grow. These plants die and increase the organic carbon load in the bottom of the river. Again, bacteria decompose it and promote phytoplankton bloom. These blooms die and the dead matter settles to bottom of the river. Gradually water and the depth of the river get reduced. Next, the water volume decreases and the river becomes swampy. Ultimately grasses appear and the river is converted to the

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grass land. These conditions occur in accordance with nutrient concentration in more or lesser time. Each biotic system has some qualitative (productivity) and some quantitative (nutrient concentration) features. This thesis was elaborated between the years of 2011 and 2015. The content is based on biodiversity of JAMUAARI River Basin and effect of Glyphosate herbicide.

Conceptual framework for research: Along this research work, only Glyphosate pesticide is going to be mentioned, as examples of sources of phosphorus. The structure and composition of natural aquatic communities, the diversity of species, and the balance and interactions between them are of profound importance for ecosystem functioning right through all the trophic levels (Pérez et al 2007). Forlani et al., (1999) shows that cleavage of Carbon Phosphate (C-P) bond take place during Glyphosate degradation by microorganisms.

Research hypothesis: Central hypothesis of this research is, if intensity of Glyphosate use and sedimentation of biomass increases then concentration of Phosphate and Organic Carbon will be increased in soil of the river bed. Microbial degradation of product of Glyphosate herbicide is Phosphate and Organic Carbon is microbial degradation product of biomass or secondary productivity (algal and planktonic blooms). pH of water has a relationship with HCO3. CO2 changes the pH of the system through the formation of HCO3.In recent years, the excessive use of phosphate pesticides to increase primary production. Primary production is one of the parameters of eutrophication of rivers. Producers in river water are phytoplankton and consumers are herbivores. Human beings, being depended upon biodiversity for their amusement survival. In recent mal agricultural practices have directly or indirectly affect zoogeography, hydrology and biodiversity. Since habitats are under stress due to mal agricultural practice, many species of living beings, which depend upon such zoogeographical habitats for their survival are disappearing. Some are common or less. Some are rare and some are invisible nowadays. With large input of nutrients from human sources, bacterial decomposition cannot keep pace with productivity and sedimentation is accelerated where by eutrophication is favored. The speedy rate of eutrophication strikes a balance between primary productivity and its bacterial decomposition. When the river catchments is filled with sediment while aquatic life is perishing. It is then turning into dry land. Lastly, we optimized aquatic biodiversity change for Glyphosate use as an impact of eutrophication and attempted to assess water hyacinth, a bloom-forming species whose abundance has been linked to Glyphosate use. Seasonal and annual variation in Glyphosate vs. phosphate signals can help determine whether summer phosphate can be linked to Glyphosate use and eutrophication in the JAMUAARI River. India has diversified climatic areas and it has several aquatic habitats. Indian civilization had spread throughout the river channel. They were used river for potable water, water feedback of pond. They made their houses near the natural lake and bank of river near tributary region. These rivers gave them from invaders. In the emergency, they escaped through river channel. Our country has a great network of river. These rivers were connected to the several man made pond. There were flooding every year that creates so many lakes. Thus, India has a major place of distribution of ecosystem. Nevertheless, there is no more research work on zoogeography. There are only some pot water related work or agricultural soil related works. India has ten zoogeographical zones. So, our first attempt to describe major impact of herbicidal pesticide on distribution of living aquatic ecosystem.

2. PROBLEM, AIM AND OBJECTIVES

The River JAMUAARI originally originated from Some shwar Mountain in Nepal as HARHA River and it joins the Ganges River near Gangsara, Indrawara. Next, it joins the river Masan at Dumari and the combined stream flow as HARHA MASAN. While, it is crossing via Chautarwa Chaur then its course named Sikarna River. Next, it crosses Jamuaa village (West of Muzaffarpur) as JAMUAARI River and joins to Ganges River near Indrawara village. Its tributaries basin at in drawara forms many types of land from Lake, natural pond (MOIN) and wetland. It is resident of Nepali migratory bird. While, one of its new branches crossed northern part of Muzaffarpur as Chhoti JAMUAARI River and join in Kamla River alongwith Balan near Manikpur Musapur and its new branch, join to Balan River near Bheeth Bhagvanpur. While it's present branch originates from Dholi village near Muzaffarpur known as Budhi Gandak and joins in Ganges River near Gogari village. The total length of the river Jamuaari - Balan is 328km of which 208km is in Muzaffarpur, 34 Km is in Samastipur and the remaining 120km is in Begusarai. In the last few decades, we have completely destroyed the river and its natural system, situation is changing from bad to worse with every passing day. In all countries, most members of the public surveyed believed that their environment had become worse over the past three decades. In recent years, environmental concern has been at the fore front of public attention. Public awareness of environmental issues is a major call for the developmental of national and international policies to protect the biodiversity. Jamuaari's actual volume is because of its tributaries that join it at different points along its course. Groundwater flowing level of its tributaries is abandoned due to eutrophication, dryad filled with sediment load, is a biodiversity concern. River JAMUAARI basin is today struggling hard for its own aquatic life sustenance. Another clear indication of deteriorating health of JAMUAARI waters is the biochemical oxygen demand (BOD), which is alarmingly higher. Against a normal scale of 3 mg/litre of BOD, JAMUAARI has 11-20 mg/litre BODat some locations and the DO of the river water at some places in the river basin was as lowas 3.5 mg/litre. Three decades ago, JAMUAARI was considered a sustained ecosystem. Today, ecological succession of the river is not even. Nutrient from farm land run-off reaching the river through several drains has

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been killing the living beings, not to mention what is up with the rest of the aquatic life. The fast-paced agriculture development is taking a heavy toll on river basin aquatic life; forget about the biodiversity change. The increasing use of herbicide pesticide has increased the nutrient pollution threat of the river. Ban on bad agriculture practice; de-silting and river inter-linking are the solution for river rejuvenation. Here, we aimed (i) to compare biodiversity in natural eutrophic condition and cultural eutrophic condition, (ii) to relate herbicide use and eutrophication, and (iii) to describe zoogeographical change in terms of the effect of pesticide. This researched work provides analytically accurate information, relevant to the conservation, biogeographically region, and environmental condition. The overall aim of this thesis was to investigate how Glyphosate enhance eutrophication and decrease biodiversity in river basin. In detail, with respect to zoogeography, ecology and hydrochemistry the objective was to determine the effects of Glyphosate herbicide on eutrophication and biodiversity (dual nature) changes in the region, in relation to natural eutrophication and cultural eutrophication in the river. Main objective was to determine how people destroy their own home, sustained by herbicide use in farming, perceives the degree of changes in zoogeography that have been induced as a result of herbicide use and how it has affected eutrophication in river. Quite amazing is the least population of bird and fish, which is suddenly declined from almost areas but highest decline in the tributary part and continues per passing years. Similarly, most of aquatic ecosystems registered dry up and continue to grow drying duration. The areas of wetland are destroyed per passing year. Drying duration of the aquatic biome is expanding rapidly. Threats to biodiversity are principally due to a decline in the areas of their habitats and declines in habitat quality. Decline of habitat area and habitat quality caused to species fragmentation. Fragmentation raises the extinction risk. For the aquatic and wetland biodiversity, the declines in habitat quality and habitat area arise from

Photograph 1

conversion of grasslands to agriculture land. The declines in habitat quality are due to loss of surface water, resulting in the drying up of rivers and other water bodies, from siltation, and nutrient from pesticides and other chemicals. Loss of biodiversity triggers large unpredictable changes in an ecosystem and adversely impact agriculture through induced changes in hydrology. . Suddenly rice field replaced with a tobacco valley (Photograph 1).

3. MATERIALS AND METHODOLOGY

To meet the stated aim of this paper (Section 2), six sampling site three adjutant to tributary and three foremost sites on the river bank of the JAMUAARI River were selected. To Working in two different characteristic points adjacent and foremost part from tobacco valley (JAMUAARI river basins) a kind of mixed methodology approach allowed for comparisons between the two biodiversity and thus served for validation of the results. The mixed data analysis approach was pursued where potential effects of herbicide use in the river basin were investigated and data collected from physicochemical analysis of soil and river water (Physico-chemical method), biodiversity of living species (Scientific Interview method) and Zoogeographical change (Physical survey method) of river. In the fields of zoogeographical study data collection from hydrochemistry, biodiversity and geography multi-dimensional technique approaches are commonly applied and are considered equally important. The usefulness of the, every methodology varies with the character of the study. In this thesis, random sampling was in focus when studying physic chemistry of water and soils (Photograph 2).

Photograph 2: Grave of saah Rattulah

Sampling data enable the identification of physicochemical patterns of individual elements and co-variations between elements which facilitate the understanding of regional geochemical change processes. In this thesis scientific interview was in focus when studying biodiversity of living beings (media 1).

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Media-1: showing interview participant

Questionaries data enables the identification of conservational status of individual species and co-variations between populations of two species which facilitate the understanding of loss of regional biodiversity. In this thesis scientific survey was in focus when studying zoogeographical change in the river system (diagram 1 to diagram 6). Surveys data enable the identification of the loss of habitat of individual species which facilitate the understanding of regional environmental change and causes.

Sixth stage of Jamuaari river

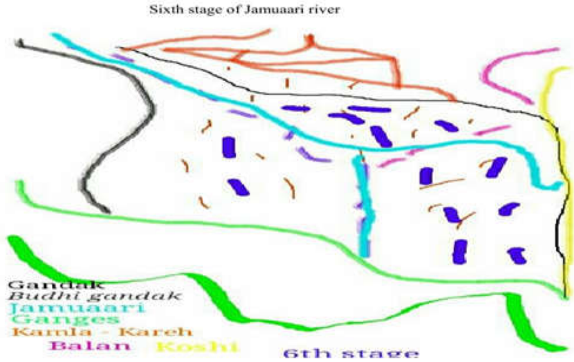

Diagram-1 is showing various river channels in the Ramayan era with associate font colour.

1.Gandak(Black),2.Jamuaari(Blue),3.Kamla-Kareh(Brown),4.Balan(Orange),5.Koshi(Yellow),6.Ganges(Green),7.Budhi Gandak(light Black).

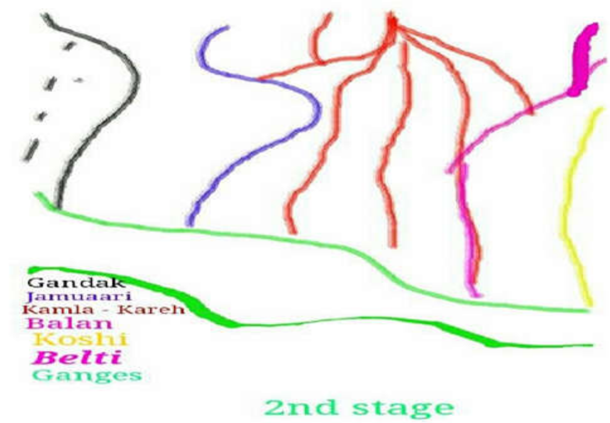

Diagram-2 is showing various river channels in the Buddha era with associate font colour.

1.Gandak(Black),2.Jamuaari(Blue),3.Kamla-Kareh(Brown),4.Balan(Orange),5.Koshi(Yellow),6.Ganges(Green),7.Belti(deep Orange).

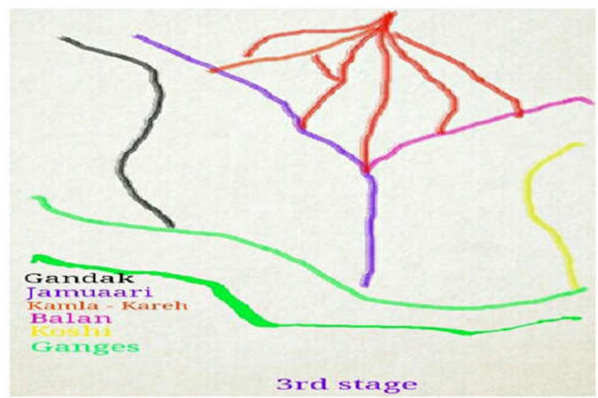

Diagram-3 is showing various river channels in the 8th century with associate font colour.

1.Gandak(Black),2.Jamuaari(Blue),3.Kamla-Kareh(Brown),4.Balan(Orange),5.Koshi(Yellow),6.Ganges(Green).

Diagram-4 is showing various river channels in the 14th century with associate font colour.

1.Gandak(Black),2.Jamuaari(Blue),3.Kamla-Kareh(Brown),4.Balan(Orange),5.Koshi(Yellow),6.Ganges(Green),7.Belti(deep Orange).

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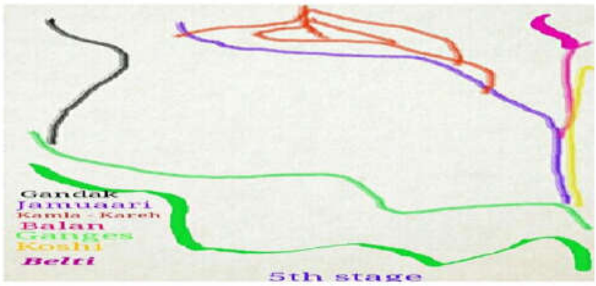

Diagram-5 is showing various river channels in the 15th century with associate font colour.

1.Gandak(Black),2.Jamuaari(Blue),3.Kamla-Kareh(Brown),4.Balan(Red),5.Koshi(Yellow),6.Ganges(Green),7.Belti(Orange).

3.1 Procedure: Following procedures were performed and F test of variance were done against PO4, Ca, HCO3, BOD and Organic carbon of both Jamuaari river basin's grain field and Balan floodplain's grain field using Power 3.1 software at level of probability 0.05 for hypothesis test. When F test of variance is 1 or close to 1, it supports null hypothesis and rejects any kind of difference between two groups. Value of F test, more greater than 1 or less greater than 1 is showing more inequality between two groups.

3.2 Physicochemical Approaches: River carries dissolved ions from surface runoff and weathering of bedrock. Dissolving ions include HCO3-, Ca ++, PO4 3-. Total dissolved solids in rivers are about 100mg/liter. Consequently, PO4 is gradually removed from the surface water of the river in form of organic matter and released at depth. Since this sinking of organic matter is the primary source of P to the soil bed While, HCO3 is coming from a byproduct of photosynthesis and phosphate competition. Under normal conditions, calcium carbonate is water insoluble.CaCO3 + PO4 = CaPO4 + HCO3_CO2+ H2O ---> H2CO3H2CO3---> H++ HCO3-Physico-chemical conditions of the river determined by elemental analysis of water and soil samples.

3.3 Sample collection: Physico-chemical conditions of the river determined by elemental analysis of water and soil samples.

Photograph 3: showing water sampling

Photograph 4: showing soil sampling

Water Samples were collected in clean plastic bottles with tight-fitting caps (photograph 3) and a soil sample in a polythene pot (photograph 4).

Sampling and data analysis was carried out in the interval of six months during five years after the five seasonal sampling and data analysis. Water samples were tested on the spot manner at each site. Directly following collection of the water and soil tested in situ and some sample were preserved for home and lab analysis. After the end of five years six extra samples were tested at each site for current aquatic health. A number of additional standard chemicals analysis and an analysis of nutrient content were carried out in PUSA an agriculture laboratory in Samastipur district (photograph 5) while BOD analysis and analysis for organic carbon were performed at the home.

Photograph 5: showing PUSA LABORATORY of samastipur

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Refer to Table 1 and Table 2 for more details on the analysis.

Table 1: Summer season parameter

Parameters	2011	2015	Difference
pH	7.5	10.2	2.7
Temperature	31.8	36.1	4.3
Alkalinity	250	230	-20
Calcium	4.1	6.5	2.4
Bicarbonate	4.7	4.9	0.2
Phosphate	35	70	35
TDS	102	151	49
DO	4.5	6	1.5
BOD	10.5	5.5	-5
Turbidity	35	25	-10

Table 2: Winter season parameter

Parameters	2011	2015	Difference
pH	8.9	9	0.1
Temperature	20.6	18.1	-2.5
Alkalinity	280	125	-155
Calcium	6.3	6.5	0.2
Bicarbonate	2.5	1	-1.5
Phosphate	30	35	5
TDS	59	100	41
DO	6.5	8	1.5
BOD	5	3	-2
Turbidity	5	5	0

At, each sampling site in the temperature of the water was measured with a digital thermometer. Water and soil quality parameters were analyzed following standards methods (APHA, 2005 and Trivedy, 1986).

3.4 Ecological Approaches: Human activities like mal agricultural practice creating a major threat to future biodiversity and is being severely pressured through the removal of continuous related biotic habitats (Erwin 1991). However, aquatic life diversity is facing tremendous threat mainly because of unsustainable habitat degradation. The rate of extinction is also approximated to be very fast and it is estimated that around 1800 populations are being destroyed per hour in tropical forests alone (Hughes et al. 1997) Biodiversity is the variety of plants, animals, micro-organisms and ecosystems that constitute our living environment is not static; it is constantly changing. However, the speed of change is increased by human activity which leads to population decline and extinction. The key points of species loss are degradation and fragmentation of habitat, unsustainable use and management of natural resources, changes in the aquatic environment and water flows.

4. TECHNIQUE AND PRINCIPLE

In order to determine species diversity of JAMUAARI River loses of biodiversity index of species in the adjacent tributary region and fore most parts of the tributary region were calculated. Ecology is the study of living habitat. Composition and pattern of species depend on their habitat. How many different species exist in a particular habitat is called biodiversity. Biodiversity changes according to habitat change. The benefits of herbicide use have also contained disbenifits, some so serious that they now threaten the survival of major species by disruption of adaptation and loss of biodiversity. A more diverse population consisting of many species has a better chance of be able to adapt to change in the environment. It is important to promote and preserve species diversity that a uniform population of a single species adapted to a particular environment is more at risk if environmental changes occur. Due to present human activity species groups are changing rapidly. To describe the number of species diversities in a given area is calculated by a formula called the biodiversity index. Review of the biological status of this biome following statistics were tested. Biodiversity index is calculated for Conservation. The dissimilarity index is checked for changes in population reference to neighboring areas. Similarity tested for loss or gain of population during given times. Simple biodiversity is calculated for population richness (Table 3 and Table 4).

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Table 3: Shows the various biodiversity indexes at Balan floodplain in 2011

Species	Richness Group1	Richness Group2	Richness Group3	Richness Group4	Simpson Evenness	Sorensen Evenness
Fish	0.010246	0.003689	0	0.00082	0.970203	0.251523
Bird	0.009429	0.004857	0.000286	0.000857	0.902464	0.30877023
Mammals	0.011475	0.001639	0	0.006557	0.873959	0.613636
Insect	0.011111	0.00202	0	0.00101	0.923783	0.8601036
Reptile	0.0125	0	0	0.001389	0.888889	0.75
Molluscs	0.009677	0.003226	0	0.003226	0.761707	0.63436123
Annelid	0.0125	0	0	0	0.5	0.947368
Amphibian	0.01	0.005	0	0	0.64	0.947368
Non flowers	0.008333	0.002778	0	0	0.716049	0.461538
Flowering	0.590909	0.318182	0.090909	0	0.983740904	0.306265

Table 4: Shows the various biodiversity indexes at Balan floodplain in 2015

Species	Richness Group1	Richness Group2	Richness Group3	Richness Group4	Simpson Evenness	Sorensen Evenness
Fish	0	0.015773	0	0	0.79949049	0.630219
Bird	0	0.01559792	0	0	0.88871801	0.90866142
Mammals	0	0.01639344	0	0	0.746775	1.483283
Insect	0	0.0162963	0	0.00148148	0.910147599	1.4407684
Reptile	0	0.01538462	0	0	0.833333	1.34020619
Molluscs	0	0.01538462	0	0	0.5	1.26213592
Annelid	0	0.01587302	0	0	0.5	1.688312
Amphibian	0	0.01234568	0.00617284	0	0.639003	1.820225
Non flowers	0	0.01030928	0.01030928	0	0.44213	0.340949
Flowering	0	0.01680672	0	0	0.031191	0.784185

4.1 Zoogeographical Approaches: Zoogeography is the study of geographical distribution of organisms. Zoogeography is the branch of Biogeography dealing with distributional patterns of animals. It is Alfred Russel Wallace, the author in 1876 of "The Geographical Distribution of Animals," With a Study of the Relations of Living and Extinct Faunas As Elucidating the Past Changes of the Earth's surface. It begins with the Wallace, and other early biologists in their attempts to explain patterning of distribution. Slater, who was first drawing regions according to fauna. Today we also know that evolutionary processes can be much faster than previously thought; besides, on smaller scales distributional patterns of organisms are often influenced by changes occurred in historical times (such as e.g. land use change, or current human-driven climate change), or natural cycles covering short times such as seasonal or daily migrations. Biogeography examines long-term processes, taking place over geological times, in the geographical areas, concerning taxonomical groups that are now extinct. Biogeography looks at how abiotic and biotic forces can influence species richness in different habitats. We might say that biogeography is the discipline analyzing the effect of space on evolutionary processes. Our research work also covers the effects of land use change on biological succession. Dissimilarities between the aquatic faunas of JAMUAARI rivers have been surveyed during 2011 to 2015 and main zoogeographic regions and succession recognized as follows. The upper region includes all rivers from Muzaffarpur to Tajpur, middle region from south Samastipur to Dalsinghsarai and the lower region from Dalsinghsarai to Begusarai. Middle region cans be divided into six tributary regions, including tributary JAMUAARI basin. These delimitations give a highly significant within region faunal biodiversity. The present patterns of distribution are the result of past geological events and current human activity affecting JAMUAARI River basin and, given this frame work, the role of pesticide use during the nearly three decades. JAMUAARI River basin and other coastal sites are being performed to explore changes in habitat over time. Historical data obtained from interview and literature were being analyzed for comparison. Rate of natural and cultural change.

4.2 Procedure: Survey started in February 2011 with the drawing of map various sites. Observation recorded on notebook. Again continuous survey set in February 2012, February 2013, February 2014 and February 2015. In the last, an additional survey carried out on the sampling sites.

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5. FINDINGS AND DISCUSSION

Seasonal and annual variation in the Glyphosate vs. phosphate and bicarbonate signal as productivity help to determine that summer phosphate and low biodiversity have linked to Glyphosate use and eutrophication in the Jamuaari River. Some parameters of aquatic good health (pH, DO) are decreasing and parameters of aquatic bad health (BOD,TDS,OC,Turbidity, alkanity, Ca , PO4 , Temperature , HCO3) are growing continuously starting three years, but some of them are inversing in the last two years. F test of variance against Phosphate, Calcium, Bicarbonate, BOD and Organic carbon are33.5000000, 0.1288190, 296000, 6.9558824 and 73.5000000, and another second group values are59.3333333, 26.7105263, 0.5740000, 3.7500000 and 584.0000000 in summer and winter respectively. F test of variance rejects null hypothesis and it supports alternative hypothesis .Some similar early research work with limited area on eutrophication define the problem to understand this research work, listed below –

According to DODDS (2002) "Eutrophication may be natural in some water body and maybe of human input of nutrients." Eutrophication deals about morphological, hydrological and ecological diversity. Eutrophication covers the functions of the river ecosystem. It may be used to identify the major ecosystem stress. Our work shows relation between eutrophication and dual nature pesticide. Early worker such as in Europe, the European Environment Agency (EEG, 1994) cites a study by Galas et al. that closely links toxicity of Po River water to the Zooplankton Daphnia magna, to runoff of agricultural pesticides. Lamp man, (1995)study of ground water wells in agricultural south western Ontario, Munkit trick et al.(1994) has found that pesticide formulation includes impurities that effect on the hormonal system of fish and cause liver disease , UNEP researcher (1993) , find that the pesticides related to oncological , pulmonary and hematological , as well as on inborn deformities and immune system deficiencies problem , and Gilliom (1984) only report on toxi logical character of pesticide , But some worker reported ecological concern , such as Jonsson et al.(1990) only find that the continued decline of the partridge population is linked to change in land use and the use of chemical weed control.

6. CONCLUSION

In the Jamuaari river basin, the higher risk of eutrophication estimated as the farmers intensify use of a wide range of chemicals as herbicide. Information about herbicide use comes from pesticide sellers, collected label of herbicide bottles and farmers. The objectives of the study were to assess the phosphate from Glyphosate, intensification of eutrophication and the risk on zoogeography of the Jamuaari river basin. As observed in this study, Glyphosate compounds are predominant herbicide and herbicide use are higher in Jamuaari tributary area than Balaan floodplain area. As mentioned in previous Section 4, it is concluded that the Glyphosate use puts stress on the aquatic ecosystem and their flora and fauna. Aquatic condition, biological succession and aquatic biome rapidly changed during previous two decades in Jamuaari River basin. High phosphate levels of these areas were mainly attributed to the use of Glyphosate herbicide in nearby tributary basin. To further prove that eutrophication is changing the river's biodiversity and topography, we tested soil and water samples from tributaries of Jamuaari and Balan floodplains with scientific interview. The samples were found to be high-level Phosphate, Bicarbonate, OC and BOD value. The dissolved oxygen levels dipped to as low as three milligrams per liter (mg/l). Minimum level of four to six mg/l is considered essential to sustain aquatic life. Fish and fish dependent species had died as dissolved oxygen level of the river water had dipped too low. The extent of eutrophication and habitat loss is such that the river's biodiversity and biological succession is being affected. In short, following changes recorded as the response of Glyphosate against eutrophication and habitat loss: 5.2

PHYSICOCHEMICAL EFFECTS Concentration of soil phosphate and water BOD values increment is supporting that Glyphosate use take part in the intensification of eutrophication. Decreasing value of DO concentration in parallel way is heavily supporting bloom condition of the river. Physico-chemical parameter of soil and water rapidly changed in the first three years , but some of them are inversely changed in the last two years .pH difference in 2011 , 2013 and 2015 are 0.1,1.2,0.34 in summer and 0, -0.6 ,0 in winter season against site 1 and site 5 . PO4 difference in 2011, 2013 and 2015 are 0.1,15,35 in summer and 0, 15, 0 in winter season against site 1 and site 5. DO difference in 2011, 2013 and 2015 are -1.5,-2.5,-2 in summer and 0,-1, 0 in winter season against site 1 and site 5. BOD difference in 2011, 2013 and 2015 are 4.5, 0, 2.5 in summer and 0, 3, 0 in winter season against site 1 and site 5. OC difference in 2011, 2013 and 2015 are0.25, 0.24, 0.34 in summer and 0.05, 0.09, 0.12 in winter season against site 1 and site 5. HCO3 difference in 2011, 2013 and 2015 are 0.8,2,1 in summer and 0, 0.9, 0 in winter season against site 1 and site 5.Turbidity is always high in summer season against site 1 and site 5, but same in 2011 and 2015.Calcium level always low recorded in the site 1 against site 5. TDS is always high in site 1, but alkanet had fluctuated between 2011 and 2015.

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