

Wetlands' generated natural assets through fishery and aquatic birds' boosting prosperity and employments

Abstract

Some debates provoke that wetlands are serving as climate smoother, bring carbon sequestration and bring improvement in agriculture. These benefits can be visualized on corollary of function of oceans, but such benefits have no visible impact. The area extents of wetlands get build up, which rather add to environmental problems. This study presents innovative technology of treating waste water to create fresh water of sustainable supply usable for rearing fish which will be consumable by human, animals and birds. Study emphasized that when fishery product is surplus, it will be usable for extraction of iodine and other nutrient supplement and the remaining part as tank aged enriched manure of organic nitrogen (N) and Phosphorus (P). It revealed that entire process will involve several tasks to be accomplished by candidates of different scientific and technical skills. The products so processed will be usable within country as well as become items for export. The different tasks will provide employ opportunities better than those of past and present ongoing Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) with respect to higher wage, payment, reducing hardship and maintaining dignity of human labor. Part of revenue can be kept as reserve fund to supplement any emergency situation such as that happened during pandemic COVID-19. The study sets alternative method of huge wasteful expenditures on river action programs. Thus, countries will have contemporary economic growth not affected by climate change. The coastal wetlands similar to those of within any country will have protection from sea actions; hence it will provide resilience against any emergency situation.

Keywords: fish and fishery, ground water governance, guano, organic N and P, wetlands, wild life bird species, environmental emergency situation

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Introduction

Wetlands have limitations of waste water infested by lot of impurities and locking land, especially lying at low levels. The wastelands are inhabited by different species of flora and fauna via fish and birds inhabit or visit season by season. The wet lands become source of detritus food chain and produce environmental hazard creating such as mosquito, protozoa, leaches and snails etc. Thus, huge land and water resources have been lying un explored. Instead the wet land have been regarded as burden, hence, although forming integral component of forest and wild life, which have got better deal, have been transferred to different states, wherever they are located. Thus, the wetlands have not received scientific research attention, thereby showing no likely improvement of their situations. With poor situation and condition wetland remain as exemplary sites of dislike. The bad situation speak of neglectful action of Governments on vast resources of land and water.

The wet land with poor quality of water receive continuous supply of waste water as almost 80% of domestic water supplied return to them, hence it maintain assured waste water availability. The isolated waste water bodies also generate wild fish, leaches i.e. detritus food chain consumers, becoming food chain for the secondary food consumers and wild birds flock around it.

Some scanty treatments of wastewater have been tried, but it exhibit low impact. The problem remain frightening as exemplified by bad situation of fires in wetland lake Perimbadoor, the largest wetland of Karnataka located in f Bangalore, Karnataka. The waste water load

is high, which cannot be sustained and high concentration forms accumulation of methane and occurrence of frequent fires. Records also show high density of wetlands in Karnataka state where, there is severe scarcity of irrigation water. Under such scarce water situations the waste water from the wetlands must be getting used as irrigation water. Such waste water irrigation is well known to cause adverse situation in city of famous Taj Mahal known for touristic interest. Thus, the problem of wetlands and waste water again worsen by the use of such waste water for agriculture.

Thus, it comes to mind that treatment of waste water making a fresh water so that highly liked commodity is produced which can be consumed by suitable agents on one hands. The wild birds of different species create dropping which is known as Guano,¹ which high biological nitrogen (N) and phosphorus (P), can be harvested. Authors previous study^{2,3} showed ways of biological N and P and exemplified this fact by using long time known data from Gustafson⁴ after elapse of seven decades. Such scientific developments are expected to go long way in improving water quality and produce wealth. The ocean like opportunities can become an enterprise of large populations moving in search of employment for their means of livelihood, in Mega cities namely Ahmadabad, Bangalore, and Bombay, Chennai, Delhi and many in the list. This innovative technology based development will create regional development for creating employment and source of increasing per capita income, necessary conditions for contemporary economic growth. Objective of present study is to take up water treatment, rearing fish, its use by wild bird species and produce Guano rich in biological N and P. enhance nutritional quality of such

biological N and P and produce products of different brands under products processing to enable their use in country as well export for income. With this contemporary economic growth it will be possible to create reserve fund resource to be used in creating welfare of peoples during any emergency.

Materials and method

Lorenz curve is relationship between accumulated per capita income per centage distribution versus accumulate percentage of population of gentry 5. A line at 45° shows line of equitable distribution of income generated by technology bases prosperity that will build its sustainability.

Main features of the Lorenz curve of Ginni coefficient are:

- i. 30% of population have only 15 % income.
- ii. 80 Of population only 65% income
- iii. 20% of population have 35% of income
- iv. If everyone had same income then Lorenz curve will coincide with 45° line

Fishery, the non dispensable water user

It is well known fact that fishery is the non dispensable water user. Its reproduction, growth rate and demand as food commodity

is tremendous for human, animal, and birds. As well as its product usable for medicinal drugs and agriculture. Therefore development of fish and fishery become feasible and suitable means of contemporary economic growth. Previous study dealt with advancing the fish with innovative use of scarce water for raising fish fingerlings and selling fingerlings to fish rearers who can raise fish inland freshwater. The present study is devoted to another sector where water availability is assured, but due its poor quality as it did not receive adequate scientific attention. The large area of such waste water accumulation caused lot of environmental problems such as bad odor, un scenic view, development of detritus chain and occasionally fire in lakes. The area extent of such scattered land water resource is large, which remain as problem and its un cared use is by variety of wild birds.

The wetlands

The wetlands got developed increasingly with increase in population and developments of civilization. Water supplied for domestic supply remain consumable by 20% and remaining 80% goes as waste water in forming lake in lowlands. In spite of several inherent disadvantages the wetlands have become unwanted and unlike component of land and water system. Its universal existence in India is listed in Table 1. The maximum area (ha) is in Karnatka, followed by that in Maharastra, Andhra Prades, Gujarat and Orissa. Contrary to this the minimum area occurs in Mizoram, followed by Haryana. Salty lake Sambhar exists in Rajasthan.

Table 1 Distribution of natural and artificial wetlands in India

Sl.No	State	Natural		Artificial		Total	
		Nos.	Area (ha)	Nos	Area (ha)	Nos	Areas, ha
1	Andhra Pradesh	219	1,00,457	19,020	4,25,892	19239	526349
2	Arunachal Pradesh	2	20,200	NA	NA	2	20200
3	Assam	1394	86,355	NA	NA	1394	86355
4	Bihar	62	2,24,788	33	48,607	95	273395
5	Goa	3	12,360	NA	NA	3	12360
6	Gujarat	22	3,94,627	57	1,29,660	79	524287
7	Haryana	14	2,691	4	1,079	18	3770
8	Himanchal Pradesh	5	702	3	19,165	8	19867
9	Jammu and Kashmir	18	7,227	NA	21,880	18	29107
10	Karnataka	10	3,320	22,758	5,39,195	22768	542515
11	Kerala	32	24,329	2,121	2,10,579	2153	234908
12	Madhya Pradesh	8	324	53	1,87,818	63	188142
13	Maharashtra	49	21,675	1,004	2,79,025	1053	300700
14	Manipur	5	26,600	NA	NA	8	26600
15	Meghalaya	2	NA	NA	NA	2	-
16	Mizoram	3	36	1	1	4	36
17	Nagaland	2	210	NA	NA	2	210
18	Orissa	20	1,37,022	36	1,48,454	56	285456
19	Punjab	33	17,085	6	5,391	39	22476
20	Rajasthan	9	14,027	85	1,00,217	94	120244

Table Continued...

Sl.No	State	Natural		Artificial		Total	
		Nos.	Area (ha)	Nos	Area (ha)	Nos	Areas, ha
21	Sikkim	42	1,107	2	3	44	1110
22	Tamil Nadu	31	58,068	20,030	2,01,132	20061	259200
23	Tripura	3	575	1	4,833	6	5048
24	Uttar Pradesh	125	12,832	28	2,12,470	153	225302
25	West Bengal	54	2,91,963	9	52,564	63	291963
TOTAL		2167	14,58,580	65,251	25,87,965	67418	40,46,545

Both types of natural and artificial wetlands are widely distributed and scattered. This fact is supporting building opportunity its wide opportunity and prosperity. Such information will be highly usable in developing this study. It is interesting to note that the wetlands were widely distributed in almost all states. This fact will be usable in future dealing of the present study.

Water quality characters of wetlands

The quality of water usually described in the form of its physical, chemical and biological characteristics. To analysis the qualities of water several studies have been conducted by the researchers time to time using various techniques, based on the established methods. Salahuddin and Chaudhary⁶ 2020 analyzed using correlation matrix, which is a table showing correlation coefficients between variables. Each cell in the table shows the correlation between two variables. A correlation matrix is used to summarize data, as input into a more advanced analysis, and as a diagnostic for advanced analyses. Analysis of variance, abbreviated as ANOVA is a useful technique for research in the various fields including statistical analysis. This technique is used when multiple sample cases are involved. The significance of the difference between the means of two samples can be judged through either z-test or the t-test, but the difficulty arises when we happen to examine the significance of the difference among more than two samples at the same time. Such study was taken up for Triveni Lake situated in Malkapur, which is a largest city and municipality in the Buldhana district within Maharashtra state of India. The samples were collected in plastic container to avoid unpredictable changes in characteristic and also analyzed as for different physico-chemical parameters such as total alkalinity (TA), total hardness (TH) and dissolved oxygen (DO) as per the standard methods APHA.² Further, the results were compared with WHO standard values Correlation matrix was prepared within the studied parameters to ascertain the relationship between the variables. The analysis of variance applied revealed the similarities or non similarities between the sampling sites and sample variables. The variable quality of wetland and lakes waters provided opportunity to determine quality status and grade the quality of products that will be developing in the study.

Status of fish production technology

The process is documented by FAO manual. It involves inducement of production process revealing that such inducement can be exercised provided favorable condition of quality of water, particularly supply of oxygen. Fresh ground water is highly suitable, provided water body is provided with shelter to protect direct sunlight warming. Thus, groundwater is with high potential of fostering fishery prosperity. The plentiful existence of wetland in India, having variable quality of

water. It reveals urgency and appropriate technology of treating waste water. The fresh water will be utilizable for fish production, which will be taken as beginning of creating revolutionary advancement of use of non dispensable water.

Fish rearing tanks

The fish rearing tank ideally designed for wetlands should be located at sites which receive water for long time. The wetland must be producing variety of biological products. For example China, had been exploiting sea products in Wuhan, which probably led to Corona Virus pandemic. This market had been closed for the time being, but again has been started at different site. Such markets must be existing along coast in district of India. The China market signals such risks from the biological water produced food materials. This will be taken up result part of the study.

Wetlands water treatment measures

Several treatment measures have been taken up for long and different levels success acquired. However, wetlands have not been attended adequately. The treatments have been costly, hence up to certain levels are resorted to. Therefore fresh water in wetland is treated with suitable filter for long time working as sites being remote, it become difficult to visit for frequent maintenance. The well known sand filter followed by gravel filter and biochar are used to keep water continuously entering I the fish tank. The waste waters after secondary treatments are released at lowest existing sites, such as rivers. In the present study, treatment of wetland's water can be created by low cost and effective treatments. Treatment setup is developed in the study remain effectively working with rise and fall of level of water. This development will be taken up in result part of study.

Wild birds thriving on aquatic food chain

Wild birds find undisturbed environment and require ample fingerling etc- for their food. There do exist variation in climate, quality of wetland water and species of wetlands , which produce different grades of fish, and product Guano. The quality of wetland fresh water will enhance nutritional quality of fish tank which will be usable for agriculture crop irrigation. Several tanks may be joined to pump out fish tankaged enrich water for irrigation for agriculture and horticulture. The detail designed feature of fish tank will be presented in result part of study.

study of the author^{2,3} had devised ways for collecting bird beats while sitting in nights and aquatic fed birds along aquatic ecosystems and its organize collection. Data collection possibility from different sources such as birds sitting on trees close rivers or lakes, in flowing

boulder zones of rivers and floating stand tied at bank. The study showed immense potential of harvesting N and P and their multiple uses. Data on content of N and P of guano were taken from source of earlier researches was used after almost 7 decades later. The research attracted worldly attention and that on N was declared Winner of World Academic Championship on Biological sciences in 2018.

referred research articles reported details of multiple uses in different categories. It is well known fact that medicines of iodine deficiency and eye tonics are devised from fish. These and many other enterprises will need the fish oils or extracts form guano. There will be need of separating the N and P based organic products for various uses.

Earlier study focused rearing the birds viz heron farm to consume non usable fingerling along inland fisheries. Thus, guano can be harvested from such birds.

Wetlands are large water bodies which are limited by excess of water. These wetlands have huge no of birds thriving on these wetlands. Tremendous potential of raising fingerlings and spreading in the wetlands will produce fish to be consumed by these birds. Earlier established methods of harvesting guano from the wetlands will enable creating industrial goods and reduce spread of pollution and clean environment. Now technologies are available to create fishery tanks with provision of water purification and raise fish in the good water, which can be usable of deriving extract from such fish. These aspects will be presented in result part of study.

Product processing of different brands

Previous researches of author have documented products in addition to those stated in aforesaid section. Various aspects will be brought in the result part of the present study.

Employment opportunities

Recent episode of suffering that developed during pandemic VOVID-19, has tremendous reveals of lack of employment opportunities. The vast wetlands as have potential of employment generations. There are technologies which need training and organizing setup for creating employment on fishery based employment. These technologies have been innovated and these extensive areas where these can be implemented. The local employment opportunity will engage people who have become unemployed in many industries. These employments will develop from moderate income and within some years it will become strong sector. Increase per capita income especially of the lowest most income group that will enhance equitable distribution of income. This development fulfills all necessary condition of contemporary economic growth of any nation. The unused wetlands remaining as burden will get transformed by innovative fishery and wild life harnessing for Guano useful resource. These aspects will be taken up in result part of study.

Results

Requirements of contemporary economic growth with respect to fishery and wildlife

There should be development of high rate of per capita income growth of population, high rate of increase of total production, high rate of structural formation of economy, high rate of social and ideological transformation, proprietary economical developed countries reach out

to the rest part of world for markets and products and limited spread of economic growth to one third of lowest population +one third of developed and two third worlds developed population still live in poverty (Figure 1).

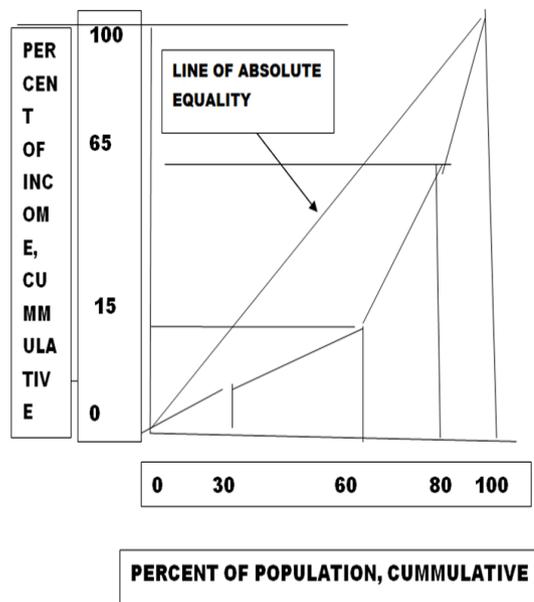


Figure 1 Lorenz curve of income distribution for contemporary economic growth.



Figure 2 Wetlands in Chennai.



Figure 3 Scene of a natural wetland cum lake.

Areas and distribution of wetlands

Table 1 contains state wise distribution of natural lakes and artificial wetland in all 25 states of India, which showed on known data basis that 40,46,545 ha area is occupied by the wetlands having water of different quality. In addition coastal land and in land riverine lands also provide fish. The innovative technology of treating waste water in fresh water and rearing fish will have huge potential which will be taken up in the following part of the present study.

Table 2 shows different fraction and quality of water based on various sources. Wetlands occupy 2600 Million ha area, but water of relatively low qualities. These areas can be effectively utilised for fishery and rearing aquatic birds for harvesting biological N and P with innovative technologies available at present time. Water in lake and other swampy, lagoons and flood plains, is of fifth order of priority (Table 2). Hence, its distribution is in almost all states, which creates opportunity of providing benefits from such developments.

Table 2 Distribution of world water resources

Water Resources	Area(millionsq.km)	Volume (mill.cu.km)	%Total water	%Fresh water
Ocean	361	1338	97.47	
Fresh water	--	35	2.53	
Ice	16	24	1.76	69.1390
Ground water	--	10.5	0.76	30.0710
Wetlands (marshes, swamps, lagoons, flood plains, etc.,)	2.6	0.1	0.0001	0.0039
Lakes (excluding saline lakes)	1.5	0.09	0.0007	0.2769
Rivers	--	0.02	0.0002	0.0079

The enhancement of utility of waste water and sea and marine water (Table 3) will ease the stress on use of water.

Table 3 Largest and Smallest, Newest and Oldest Ramsar wetlands in India

Ramsar sites	States	Area , sq km
Sunderbans wetlands	West bengal	4230
VembanadKol Wetlands	Kerala	1512
Chilkalake	Orissa	1165
Low sizes		6607
Total areas		13514 sqkm=135,1400 ha+

1 sqkm=100ha

Technological status of fishery

Fishery development is supported by strong research support under Indian Council of Agricultural Research and State Agricultural Universities. The fishery is subdivided as Inland fishery and Marine Fishery and both sectors are supported by research, education and extension. While inland fishery is practiced throughout terrestrial part of country, the marine fishery is extensively operational in the marine and along seacoast. The research backing has made fishery department highly equipped with fishery production technologies, manoeuvrment and innovative technology. Previous section 2.2 listed in Figure 4 amply support the status of fishery science and technology in India. While sea and marine fishery associated gentry have opportunity to harness sea and marine fish reserve for capture and

sail, those part of gentry on terrestrial tract need extra effort to raise fingerlings and seed the water bodies, safeguard from pray, maintain aeration and regular feeding. These results are dealt with in detail in another study.⁷ While fishery is going in extensive way, still many people who eat non vegetarian meals have no adequate access. At the same time the other benefits which will become usable by almost all gentry has not been known or practiced. Thus, the wetland locked land water resources remained unutilized. Therefore, the present study concentrated on using wetlands for creating fresh water fishery by innovative technology from the wetlands and foster multiple uses of fish, nutrients derived from it and develop chain of activities for development of employment and prosperity.





Figure 4 Fish development with plentiful available water.

Treatment of waste waters of wetlands

This is an ethical of capturing fish by restricting flow. Such restricting flow and making arrangement for capturing fish causes lot of flooding and making delay in drying of fields for agriculture. This non monetary and non disputable capture of fishery will enable administer restricting on flood causing blockage of rivers and water course⁷ reported concern and worry from climate change on fresh water fishery. This study reported need of selection of species which will be strong enough to overcome adverse impact of climate change. The approach of raising fingerlings with ground water and releasing (Figure 4) the grown fingerlings in fresh water as and when it is flowing is better approach, which is being emphasized in the present study.

Fishery in wetlands for enhancing wildlife for harvesting guano

Vast areas of wetlands, deemed problem can be converted in potential resource creating asset. There are large no of wetlands existing in India in particular and on earth surface, in general. Some studies reported shrinking of the wetlands by 1%. It is important to note that with the increase of population and development of domestic water supply, almost 80% of water supply return as waste water to join the wetlands. Therefore, the situation with land worsens with time. Many benefits narrated by the researches on utility of wetland systems such as smothering environment and acting as carbon sink are not adequately convincing. The wetlands fall in the purview of Central Ministry of Environment and Forest, but the wetlands have been transferred to states and its upkeep and maintenance declared as state sector asset. States have their own local problems to look at, but situation of wetland sector under state sector get to no betterment. Hence, natural resource of land, waste water, fauna and flora do not come any beneficial use. Some argumentations claim that wetlands smoother climate change and protect environment and agriculture without any visible and measurable index. Therefore, for important

natural resource there is need to bring innovative and lucrative measures.

Table 4 contains location, state and area of wetlands of largest and smallest, newest and oldest wetlands in India ranging from 4230sqkm and small size wetland Ramser sites. In addition all cites have some wetlands having similar feaatures. So far these have been regarded as problems.

Table 4 Removal of some chlorinated organic

Compounds	Concentration, micro g/100g		
Aldrine	48	<1.0	99
Dieldrine	49	0.05	99
Endrin	62	0.05	99
DDT	41	0.1	99
Arochlor 1942PCB	45	<0.5	99

These lakes are inhabited by bird heron and other aquatic eating fish. The lake sites and water and inhabitants could not be found useful in any way before. This study has presents use of Guano in earlier section. This guano is highly rich content containing, polluting water. This authors previous studies using almost seven decade old data presented innovative method of using such guano. In the present study it proposes to harvest the Guano and collect biological N and P, which have multiple uses. (Table 2).

The Tank size mat vary in diameter but shape, height and filtration units should get same for all sites. Fingerlings should be released in fresh water in tank. The adjoining wet lands also be supplemented with finger links, that will attract the birds inhabiting in surrounding. Rafts should be provided for sitting of the birds. These bird bits can be collected by using water for dilution and collecting white mixture in jerry cans.

Activated biochar is highly effective in removing the chlorinated organics (Table 5). The chlorinated organic will eliminate toxicity for fish and in turn in the wild bird that will produce Guano. The Charcoal treated water will be free of any colour hence it will create pleasant living for fish as well as fingerling. The wild birds will remain in surrounding of the water tanks and fishery. The rakes for sitting of birds should be placed in close vicinity.

Table 5 Effect of humification by tankage on enhancement of Nitrogen (N) and Phosphorus (P)*

S.No	Item	Content	Tankage
Biological Nitrogen, %			
1	Fish	4-6.5	6.5-10
2	Meal meat	10-11	
3	Poultry manure	2.5	10
4	Guano Bird dropping feeding or aquatic fish		10
Biological Phosphorus, %			
6	Fish (acid)	3-6	4-8
7	Poultry	0.65	3-13
9	Guano		10

2,3 Yadav, 2014, 20154, Gustafson, 1937;20010

Tankage technology for enhancing nutrient content of pumped ground water

The fact presented in Table 6 & 7 reveals a miraculous enhancement in organic nitrogen (N) and phosphorus (P). The range increase goes to 10 percent for guano and poultry manure.. The bird beats that would be collected from ground under the trees at bank of rivers, lake and other water bodies, in dry content, when brought under tankage,

its content enhancement goes to level equal to level of Guano. The tankage of fish will also acquire same level of N and P content. In case of fingerlings rearing there will be some enhancement. But this is first attention some researches in future will be able to ascertain the range of such increase in fingerling rearing tank water. This scientific fact support that ground water proprietors will be benefited by tankage in fish fingerlings production. Sharing of water for the fingerling production activity is very small.

Table 6 Multiple uses of biological N and (P)

S.No	Form of nitrogen	Nature of use	Product
A Biological N organic compounds			
1	Azoo components	Used as dye stuff	Contain double bonded nitrogen
2	TNT Tinitrotoluene	Mixture of concentrated Nitric acid and Sulphuric acid	Scent
3	N ₂ used to provide inert and dry atmosphere	Used as preservative	Check chemical degradation of food that goes in presence of oxygen and water vapor
4	In liquid form	Used as low temperature industrial refrigerant	Refrigerant
5	Nitrogen and Carbon	Used for making plastics	Plastics
B Biological Phosphorus (P) organic compound			
5	Posphorus dye	Textile bright washing	Becoming acceptable for textile manufacturing company
6	Building material	Trace added for bright color getup	Useable in paint and polishing materials'
7	Textile coloring	Trace added for bright color getup	Fast color printings brightness of colors, enhance
8	Cloths and clothing maintenance		Removes yellow tint and produce some brands of soap.
9	Instrumentation	Used as phosphorescent chemical dye	Used in instrumental panel and dash boards
10	Scientific research studies	Used as tracer dye in scientific research	Measurement of velocity of flow
11	Velocity measurement	As tracer dye	Direct measurement of river discharge

Table 7 Process and products of N and P for producing industrial products develop industries in different states

S.No	Area of use	Brand products	Use of biological	Impact of its use in country
Uses of Nitrogen (N)				
1	Urea	Ammonia is used for preparation of urea	Agriculture	Increased production
2	Ammonium chloride	It is used as flux in soldering and galvanizing		A usable compound
3	Hydrozone (N ₂ H ₄ and hydrozonic acid (H N ₃)	These are highly reacting compounds	Used as fungicides	Save Agriculture
4	Nitrogen Tetraoxide (N ₂ O ₄)	Was used as rocket propellor	The vehicle was used in APOLLO Moon Program	Prestigious projects
5	Hydrozonic acid BP (N ₃) ₂	Chief use in hydrozonic acid, which is used in sensitive compound for explosive detonation	Specialized use	A compound of utility
6	Ammonium nitrate (NH ₄ NO ₃)	Ammonium nitrate used as cracker	Crackers are used for amusements and celebrations	Understand any misuse
7	Nitrus Oxide (N ₂ O)	It is used as anesthesia,, but it needs purification from nitric oxide and nitrogen Oxide	To reduce N ₂ O	No and NO ₂ are toxic compounds

Table Continued...

S.No	Area of use	Brand products	Use of biological	Impact of its use in country
8	Organic N			
9	Azoo compounds	Used as dye stuff	Contains double bonded N	Knowledge for better product
10	Preparation of scents	TNT trinitroloene	Concentrated HNO ₃ and H ₂ SO ₄ make aromatic compound.	Local applications
11	Used as food preservatives	Dry N ₂ used as food preservatives	Scope for finding better product	Check degradation of chemicals and foods.
12	Industrial refrigerants	Liquid form	Likable quality	Making life comfortable
13	Plastic production	N ₂ and CO ₂ Compound		Various uses
	Organic P			
14	Use in organic agriculture	Organic P can be used in making several products.	Usable in all types of agriculture	Will enhance efficiency of costly input P
15	Textile whitening and color dye	Phosphorus dye	Cloths and clothing	Enhancement in maintaining living style
16	Soap and detergent	Liquid P can be used in improving different brands of soap and detergent	Reduce pollution	As above
17	Instrumentations and dashboard panels	Can be developed	In light weight decorative components	Safety and presentable materials
18	Used in scientific study of measurement of velocity	Can be developed	Scientific use	Advancement in science and technology

The fingerlings will be ready for sale to users who will rear the fish in their own water bodies constructed in flood plains of assured flow from mid July and rear in till Mid November. Extra feeding of such fish will create growths of fish as depicted in Figure 4. Here the enhancement in organic n and P in tankage water will be high, that will enable sale and recover some expenses on feeds etc. This opportunity will enhance sustainability of the fishery activity.

The simple fishery structure in flood plains lower ground and rising water can be a wire mesh rolled in large diameter perforated cylinder. The cylindrical net will acquire its strength due to its circular shape and height longer than highest level of floods recorded at site. The fingerlings released in such cage structures, will be getting all time flowing water with rise or fall in water level. The fish will grow and ate convenient time, depending on water level it can be fed by floating packets and also taken out for sale. Thus, flood water can be harnessed for rearing fishery. The system is highly sustainable in canal that flow for long days.

Multiple uses of organic N and P

Earlier studies of Yadav^{2,3} have brought out extensive uses of harvested biological N and phosphorus (P). The Table 2 below presents some relevant common uses. Organic n is used in dye stuff, artificial scent, in liquid form it is used as refrigerant and N and carbon chain compounds are used in manufacture of plastics.

Biological phosphorus will be in high demand for organic agriculture. Phosphorescent dye: Phosphorus dye find place for textile bright washing basis for use explained becoming accepted by the textile manufacturing company, building materials, trace additive for bright color getup. It will find uses in the paints and polishing material and this study. Textile coloring, fast color printing use the

organic phosphorus. The phosphorescent dye additive will increase the brightness of colors, cloths and clothing maintenance, soap and detergents. It removes yellow tint, produces white tint for some soap of brands used and instrumentation. Used as phosphorescent chemical dye, used in instrumental panel and dash boards in scientific research studies, used as tracer dye in scientific research on velocity measurements (Subramanyam, 2009). It is used in chemical method: direct measurement of river discharge.

Product processing and brand products

The biological products of N and P harvested from guano will be usable in making variety of products to be produced in industry. These industries will enable creating employ opportunities in all districts. The industrial products will lessen pollutants of soil and water. These developments will demand building still no of wetland so that pollution of river water can be kept free of pollution. That means huge budget wasted in building sewage treatment plants (STP) can be avoided. This will mean change of projects for sewage water treatments and managements.

Collection and processing for creating employment opportunities

The collected guano need to be processed for separating N and P. The wetland should have full-fledged chemical analysis labs with advance equipments.. Various products of multiple uses as per Table 2 and listed in studies^{2,3}

The entire task will produce huge employment opportunities, as the domain of wetlands, coastal lands and inland fishery is very large. Such resources have not come to the minds of other researches, as it involves convergence several specialties' such as land and water,

fishery, wild life and imaginative imagination 8 and eagerness to develop such enterprises. This research has created all these rearing fingerlings, rearing fish in inland fresh water, rearing fish in fresh water created in the wetlands, collection of Guano⁴, their chemical analysis, product processing and marketing and sale activities and brought in the form of train of activities of huge potential and create economic growth of nations and employments.

Business organization of wetland fishery and harvesting of Guano

The industries are located in mega cities and workers congregate in search of employment. This situation has proven as bad scenario of developments. The industries are largely in private sector which aim and harness capital and hardly show resilience in any setbacks. The sudden lock down of industries made the worker without any employment and source of business. And suffered in movement and lack of fulfilment of basic human needs. The political wisdom did not enable the governments to create local employments. Hence, in search of employment people moved from their houses and had to live under costly situation. This fact necessitates creation of local employments. In this direction gram panchayats are authorized to provide 200 days employment, mostly earth works in making village roads and paths. Daily wage is Rs 220/per day or so. This employment is for name sake and making big claims by the Governments.

Technology on fishery

Wetland is natural water limiting but assured supply and large area remaining unused for any specific production. The waste polluted water produces variety of detritus food chains which become secondary food chains for the wild birds thriving on aquatic ecosystems. The innovative technologies of treating waste water and its use by rearing fish, which has high productivity have been covered. The huge land locked in wetlands will get in production system without demanding any extra non renewable resource such as land. This research has already covered such technological innovations which will go long way in fostering cause of business development in wetland related business.

Group job performance

Group job performance is an important wing of global production. This wing (Figure 9) is again function of skill of people, motivation and environment. In India lot of educational facilities of teaching and training as well as its application by various state governments make huge people involved in fishery. However, no fishery development has been undertaken for such wetlands. This wetland being known as performing environmental functions, have been transferred to state sectors, but still these wetland have not been utilized. Therefore, treatment of wastewater is first task of treatment of water. The treatment technology needs specialist for developing fish fingerlings, releasing the fingerlings and feeding etc. The treatment filter is so well designed that it will keep always water available in tank for fishery. The grown fish should be taken out and brought for profitable uses. The third factor environment which is a governing factor will not play important control, but it will remain unaffected by coastal violent storms, if a sealed cover is kept ready and can be installed when there is any warning of such events to occur. Huge population as depicted vide Figure 9 will be employable for facilitating productivity of wealth producing resources.

Finance

The wetland requires finance for creating fresh water tank and filtration unit and cost of fingerlings. The tank and filter construction falls in the permanent structure having serviceable life, hence such facility can be constructed by getting budget on loan which can be refundable as incomes become available. Other expenses are minor, which can be managed year after year. Therefore, finance (Figure 9) will not become a limiting factor. State Governments and their Ministries of Water Resources and Environment and Forest should be providing budget for the permanent structures. Thus, the present research provides a supporting technology for their action on wetlands falling in their states.



Figure 5 Scennario of aquatic birds thriving on fish or other aquatic primary products.



Figure 6 Scenario of clusters of wild bird here in wetland, making potential sites for harvesting guano.

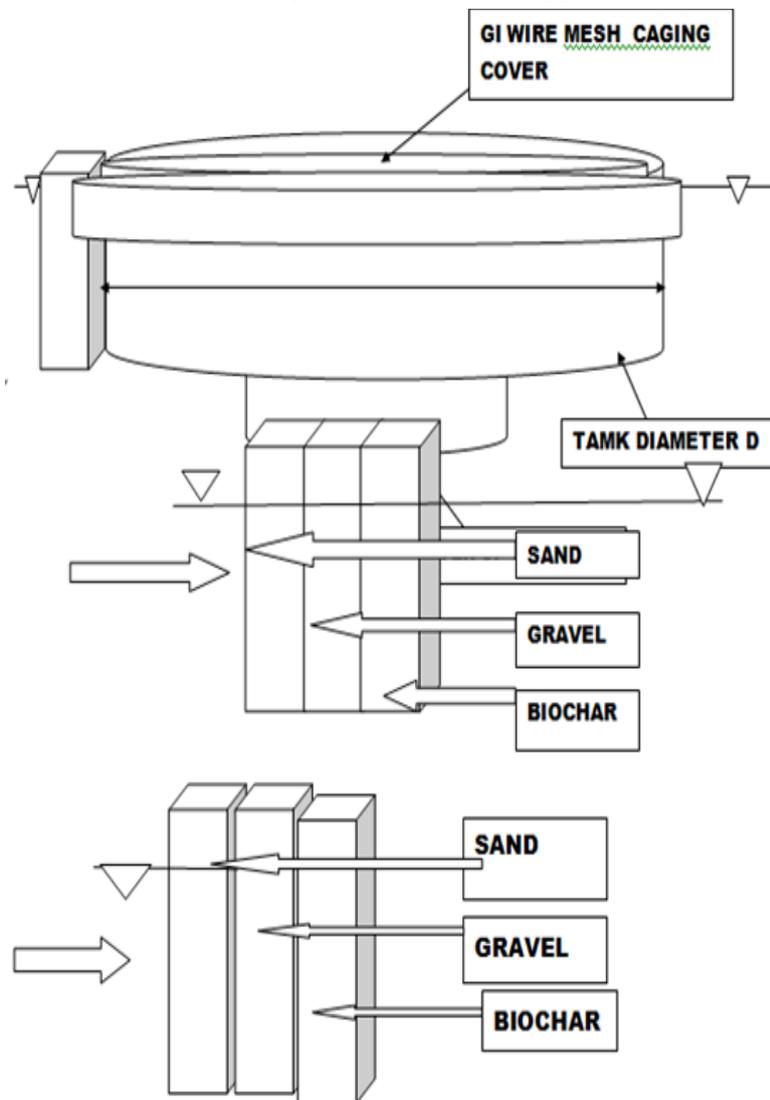


Figure 7 Proposed site for rearing fish in the wetlands in the wetlands.



Figure 8 Wetlands having other species of birds which inhabit and produce guano, making potential harvesting sites.

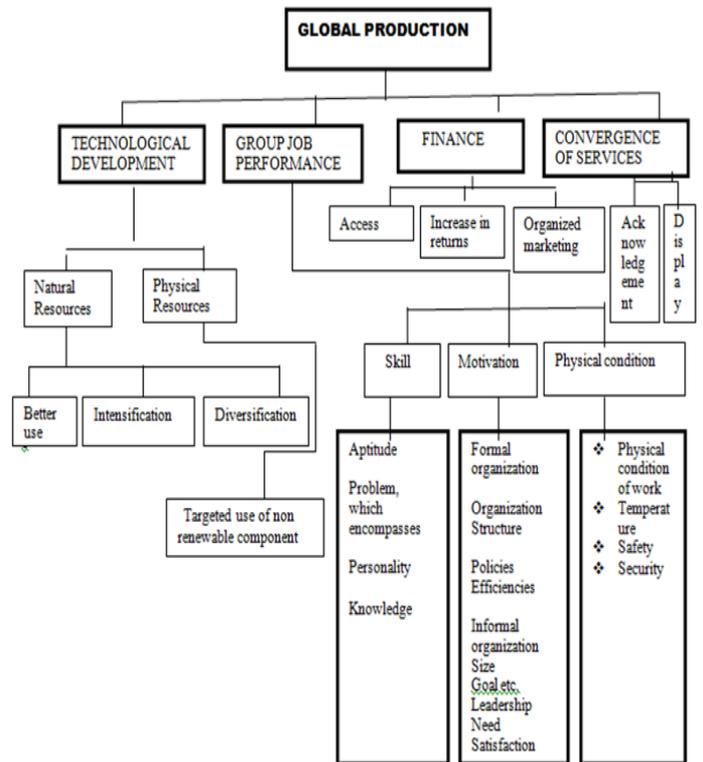


Figure 10 Prospecting production function.



Figure 9 Large No of people on move returning to their home due to closure of industries during pandemic COVID 19. In 2 March 2020.

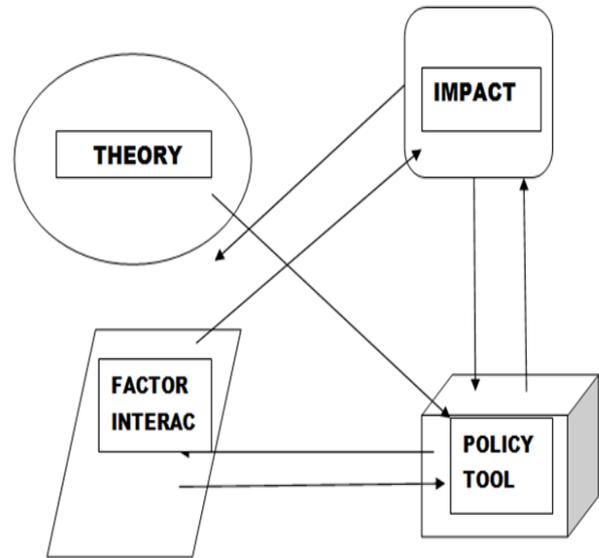


Figure 11 Linkage between theory policy tool and customized research based interaction impact for local moderation.

Convergence of services

As wetlands enterprise will involve lot of facility viz, water treatment, fishery, rearing of wild birds which thrive on aquatic ecosystems, harvesting of guano, chemical separation, analysis, product processing and marketing and sales. It will involve variety of services and their convergence will be highly effective. Initial convergence will support its initiatives and depending on prosperity the converting services will provide employment opportunities.

Discussion

All the issues and activities have been innovatively created starting from treatment of waste water, creating storage tank, their rearing in fresh water, and creating fresh water in the wastelands for fish rearing and that for birds thriving, harvest of biological N and P, its multiple product and marketing, that fulfill contemporary economic growth. The following discussion is ratifying the different aspect under various sub heads.

Fulfillment of various aspects of contemporary economic growths

Fishery initially involves small input of water and grow profusely with no dispensable use, of fresh water. The continuous inflow of good aerated water can be maintained in the wetlands. If there is lack of dissolved oxygen; that will be known after running its cycle in the wetlands, a wind mill can be suitably installed to continuously enrich oxygen supply in tank. Thus, fish production will make fish available of different quality and varying uses whether alive or dead. Dead fish tank aged fish will provide enhanced content of organic nitrogen (N) and phosphorus (P). Thus waste water and land locked in wetlands can be brought in productive use. The natural growth of fish, natural thriving of wild birds will produce Guano in natural way. Harvesting of natural products viz fish alive or dead an harvesting of guano will build valuable resource which will produce product of multiple utilities. Thus this venture will foster prosperity and employment opportunities. The products will cater need of nutrition and enhance income growth of poor gentry.

Scarce water use for fishery

The ground water is scarce and polluter water brought fresh becomes usable things to get benefits from it. This author created innovative way of biological harvesting fro aquatic fed birds, thus, created a linkage of harnessing biological N and P through fish and birds. The innovative technology is in no way affecting the wetland, which one mat think that wetlands are necessary for environment and agriculture. Thus, waste water has been enabled to be used in different way for harnessing production of prosperity and employment. As brought out earlier fish tank age induces enhancement of nutrient content of water, its application in the sector of irrigation will eliminate and bad impact on soil physical condition and reduction of productivity. This aspect although documented long back⁴ has been applied as innovation in this study after eight decades. The treated fresh water's no dispensable use will create resource poor people making his own income that means he will keep this activity going year after year making highly sustainable.

Extensive adoption of fresh water fishery as non dispensable user

As the wetland have large areas and waste water made unfit for use this innovative use will enable extensively use for rearing fish and enhance population of bird, by creating necessary facility for bird natural breeding, which will strengthen source for income generation. The harvested products, be fish or guano will become products of multiple benefits. Thus waste water and locked land will come in production system, which will reduce stress of water shortages and bring sustainability.

This new technology will eliminate risks of climate change factors

Sarkar and Das, 2019, rued impact of climate change of fresh water inland fishery. They proposed breeding of fish species, which will

withstand the hardship created by climate change. The use of scarce water for raising fingerlings and release in freshwater cages will go long way in overcoming such risks. Thus, the present innovative development creates sustainable production off fresh water inland fishery. The new technology will not get adversely affected by violent incidence.

Creating fresh water in wetlands and using it for fishery

The water in wetlands is highly sustainable as it receives continuous supply of water . May be waste water level recedes in the wetland. The wetland are inhabited by heron and many other species of birds which depend on primary food gains of aquatic ecosystems. Many express concern on shrinking of wetland, which go on building with increase in population. They justify existence of wetlands to smoother environment, climate change, and agriculture,⁹ which is of no direct and immediate visible benefits. Thus, lot area, waste water and flora and fauna remain locked without creating any visible productive resource. Creating fresh water facility in the wetlands is an innovation of toil free facility. This fresh water is usable for inland fishery; which can be used for human, wildlife bird to produce guano. This guano is innovative products from wildlife products having immense values and uses. The wetlands also can be seeded with fingerlings, which will grow and get eaten by wild birds producing harvestable guano and this droppings similar to poultry manure, which has huge potential use in agriculture and other uses of organic N and P.

Enhancement of fishery and wildlife based Guano harvesting and allied business

Several innovations presented in the study created new productivity, new products, from fresh water inland fishery coming in direct food based use and wetland locked waste water and area of wetlands, creating ocean of resource and opportunity. This product of multiple use Table 2 and those presented in studies,^{2,3} This is a technological breakthrough of resource use by natural process, without causing and stress of existing ether good or bad resource. In these researches nature is facilitated to produce product of multiple uses, creating tremendous prosperity, employment opportunities.

Applicability and status of utility of innovative researches of the present study

All innovative developments in the present study are based on universal facts, hence they are used as Policy. Tool for enhancing contemporary economic growth (Figure 9). These researches become part of Policy Tool for fostering fishery and enhancing utility of fresh water for non dispensable use and wetlands' waste water resources highly useful and productive, without creating any distressful situation. These policy tools are applicable for all sectors of fishery, in global applications. While theory based policy tools provide global perspective, customized researches can bring some moderate adjustments in local situations.

Conclusion

This study creates contemporary economic growth by using products harvested from fish and aquatic birds in wetlands. There is tremendous scope of producing industrial goods and providing employment opportunities. This research opens simple method of untreatable tertiary waste water treatments, which crates lot of health hazards. The wetland stored such waters can be usable for creating such ventures to produce valuable wealth. This research gives new way of eliminating costly sewage treatment plants but hardly showing

any improvement in situation. Thus, such projects should be replaced by collecting waste water, may be in wetlands and not allow waste water enter in rivers. This will eliminate wastage of huge budget in ineffective river action programs of Ministry of Water Resources. Sharing of proprietary dominant ground water ownership for non consumable use for raising fish fingerlings to be extensively used for fresh water inland fishery. The innovative technologies will go long way in creating wealth from wetlands.

Conflicts of interest

It is declared that there is no conflict of any interest of authorship.

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