1. The state, Orissa (Area, 60,169 sq. miles), lies in the sub-tropical belt of medium pressure, between 17° 31' and 22° 32' N latitude and 87° 31' and 87° 37' E longitude.

2. The district Sambalpur lies between 20° to 22° N lat. and 82° to 85° E long. towards north-east of Orissa.

3. Sambalpur is amongst the central table land and variations in seasonal as well as circadian temperatures are higher than that of the coastal districts.

4. The maximum temperature varies between 35°C to 45°C and the minimum between 15°C to 34°C.

5. During monsoon, due to high humidity (90%), the weather remains stuffy and sweaty.

6. Mean minimum temperature in winter falls to 16°C, the maximum being 33°C.

7. Mean rainfall at Sambalpur is 1400 mm with 63 rainy days of which 1179 mm is received during July, August and September.

8. The rain factor (P/T) is 57.6 and mean annual temperature is 26.9°C.

9. Mean per cent humidity varies between 48 to 60 showing the maximum value from July to October.

10. The texture of the soil is loamy sand to sandy foam consisting of rock, gravel quarts and is highly acidic to neutral.
11. Its water-holding capacity is poor.

12. The irrigation facilities are provided by the canal system to the cultivated lands.

13. Sambalpur fish farm was established in the year 1949-50 and is situated near Kamali Bazar, occupying 51.96 acres of lands and encloses 11 stocking, 3 nursery and 4 rearing tanks.

14. Six species of major as well as common carps are being cultivated here, out of which Catla, Rohu and Mrigal belong to Indian major carps and silver carps and grass carps are exotic fishes of common carps.

15. These are being cultivated 3-6-species ratio, 3-species ratio and 4-species ratio.

16. The breeding of Indian major carps are done during July, August and that of common carp during July, August and September as well as during January.

17. The condition of weather is bright during winter, bright and sunny during summer, cloudy and rainy during rainy with seasonal variations.

18. High pH (pH 7.0 to 9.0) values are obtained during winter and summer and low pH values (5.0 to 6.5) during rainy season.

19. Dissolved oxygen content varied seasonally from 1.6 mg $l^{-1}$ to 10.0 mg $l^{-1}$. Winter shows higher values (10 mg $l^{-1}$) and summer attributes lower values.

20. Free carbon dioxide varied from 8.0 mg $l^{-1}$ to 440.0 mg $l^{-1}$ seasonally.
21. Seasonal variations in carbonate alkalinity are began with 5.0 mg l\(^{-1}\) and ended with 20.0 mg l\(^{-1}\).

22. Bicarbonate alkalinity is varied from 14.0 mg l\(^{-1}\) to 180.0 mg l\(^{-1}\) throughout the year.

23. Chloride content ranges from 3.0 mg l\(^{-1}\) to 42.0 mg l\(^{-1}\) around the year.

24. Temporary hardness as well as permanent hardness in a year vary from 36.0 mg l\(^{-1}\) to 220.0 mg l\(^{-1}\) and 48.0 mg l\(^{-1}\) to 200 mg l\(^{-1}\) respectively.

25. Acidity shows variations that starts from 4.0 mg l\(^{-1}\) to 160.0 mg l\(^{-1}\) around the year.

26. Humate alkalinity varies from 2.0 to 6.0 mg l\(^{-1}\).

27. SDO around the year varies from 6.0 mg l\(^{-1}\) to 6.4 mg l\(^{-1}\).

28. Three groups of algae are identified such as (i) Chlorophyta, (ii) Cyanophyta, and (iii) Bacillariophyta.

29. In total 7 species of Chlorophyta, 3 species of Cyanophyta, and 3 species of Bacillariophyta are identified.

30. Bimodal nature of population peaks for whole phytoplankton was observed during early winter and early summer, in terms of percentage of distribution and percentage standing stock.

31. The standing stocks, per cent composition of phytoplankton flora show the seasonal fluctuation due to variations in composition of its different groups.

32. Four groups of zooplankton are identified as such (i) Protozoa, (ii) Nematoda, (iii) Rotifera, and (iv) Arthropoda.
33. In total 15 species of protozoa, 1 species of Nematoda, 9 species of Rotifera and 35 species of Arthropoda are reported round the year.

34. Bimodal population peaks for total zooplankton are represented in early winter for primary peak and in summer for secondary peaks in the per cent distribution and standing stock.

35. The NPP and GPP do not show any different seasonal trend during entire survey period, that vary from 2.46 g C m⁻² day⁻¹ to 12.6 g C m⁻² day⁻¹.

36. The higher as well as lower values of biotic respiration are obtained during rainy and summer season respectively.

37. NPP:GPP is highest in summer and is lowest in winter.

38. The ambient water temperature exhibits a clear diurnal trend of increasing during day and decreasing during night hours.

39. No clearcut circadian trend of colour is marked throughout the year.

40. pH values do not show any significant diurnal trend during 24 hours day regime.

41. Higher and lower values of dissolved oxygen content are obtained during day and night hours respectively.

42. Free CO₂ exhibits a circadian trend of decreasing during day and increasing during night hours.

43. Carbonate alkalinity was found to be absent during the whole circadian rhythm.

44. No definite bicarbonate alkalinity is observed during circadian rhythm.
45. **Productivity** shows a circadian trend of attaining its peak at 1200h.

46. The phytoplankton population shows maximum density at 1200h and minimum during 2400h.

47. *Euglena viridis* shows its maximum density during 0200h to 1200h. *Closterium* species, *Nostoc* species are peak at 1200 hours.

48. Regarding zooplankton, these exhibit a characteristic circadian pattern of increasing in number during night and of decreasing during day hours.

49. The correlation between female and male ratio indicates that there may not be much influence of female and male ratio on the fertilization process.

50. The -ve sign of the correlation indicates, probably a lower ratio of 1:2 to 1:3 is preferable for optimum results as the correlation is -ve and -0.224.

51. With respect to weight of breeders, the fertilization and hatching decreased with increased weight of the breeders. This appears to be sound as older and bigger ones may lead to lesser percentage of fertilization and hatching.

52. With regard to dose of pituitary extract, the 1st dose is not effective in improving fertilization and hatching. It may be the administration of a lower dose increase the fertilization, but fail to be sure regarding the exact amount of dose to yield maximum fruits.

53. From the statistical analysis, it appears that, the rate
of fertilization and hatching decreases with increasing the pituitary dose extract injection.

54. Since the correlation is +ve and also significant, therefore, the dose to male improves fertilization and hatching. Its effect seems better than the doses given to the female breeders.

55. From 40 degree of freedom (42 - 2 = 40) and at 5% level of confidence, the correlation coefficients found to be 0.304. Hence results are significant, i.e., representative. Thus the inference from this set is very realistic.

56. From the point of view of fertilization as well as hatching, the specimen Mrigal exhibits best performance as its mean is highest among the three averages and at the same time, its standard deviation is low for fertilization and almost same as other for hatching. Accordingly the Rohu and Catla rank second and third in fertilization while they rank third and second in hatching.

57. Dewatering of stocking tank was made by pumping machine followed by liming at the rate of 100 kg per acre.

58. Eradication of predatory fishes are made by frequent netting as well as addition of diluted fish poison.

59. Kerosene oil at the rate of 30 litres per acre and Turpentine were added respectively to the ponds whenever fatal condition arises and the sum results are obtained to be successful.

60. Raw cowdung as well as superphosphate were added to the culturable fish pond and sound results are achieved.
61. Stocking and survival values rate of 5 lakhs/ha and 75% respectively appear to be quite sound and satisfactory.

62. Rice bran among the artificial food is found to be more successful and productive. The preference of rice bran is more than other artificial food.

63. Approximately 100 per cent success in transport of fish spawn and fish fry by oxygen injected polythene bag to different places (within 200 km) is obtained.

64. There is regular inspection of pond (3 times) by the service of man of this farm which in fact increase the rate of yield.

65. Successful composite pisciculture is well-practised in this farm (i.e., Catla catla, surface feeder, Labeo rohita, column feeder and Cirrhina mrigala, bottom feeder).

66. Six species combinations, i.e., Catla - 10%, Rohu - 10%, Mrigal - 5%, Silver carp - 30%, Grass Carp - 20% and Cyprinus carpio - 25% and following percentage of fingerlings are to be stocked in 4 species combination, i.e., Catla - 25%, Rohu - 37.5%, Mrigal - 15% and Cyprinus carpio - 22.5% for better prospect.

67. Sampling is done once regularly in every month to ascertain the quality of food to be fed during subsequent months.

68. Mainly seasonal harvesting is practised in this fish farm and found to be sound than perennial harvesting.

69. Average fish growth as recognised seasonally are put down
herewith such as Catla 750 gm ± 50, Rohu 500 gm ± 40 gm, and Mrigal 550 gm ± 50 gm and incurred to be quite satisfactory.

70. Total netting times during 1983-84 are 72 times and appear to be satisfactory.

71. Total sum weight of fish during aforesaid period is 971,480 Kg. and marketing is 971,480 Kg. This is in fact sound.

72. Local made gears (i.e. drag net) for fishing is practised made up of nylon thread.

73. Proper and best precautions and remedial measures are taken to keep the growing fishes in well-to-do conditions.

74. Artificial feeding and fertilization are stopped as soon as the normal condition is restored.

75. As this farm is situated near the Kamali Bazar which is a thickly populated place and mostly illiterate persons do live there, abuse of water, free access of local people, nightsoili should be checked up and it should be wise to construct a fish farm far away from such local people.

Even with many adverse ecological factors affecting the environment of the fish farm the fish production is quite satisfactory here. Few traditional methods like selection of the fish as per weight, number of male to female combination in the hapa are to be modified to improve fish production as per our observation. The pituitary dose is to be monitored properly for better fertilisation and hatching. Our study has highlighted a lot of information for the fish farm and with this reference there can be improvement in the production and growth of fish in the farm.

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