# Impact Analysis of IWMP on Jabar Watershed at JhaldaII Block of Purulia District in West Bengal

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**Abstract—***The present experiment was carried out with the objective of investigating the awareness of the farmers of the Jabar Watershed regarding IWMP and Soil Water Conservation measures and investigating the impact of IWMP of Jabar Watershed on some selected watershed health factor on the basis of reconnaissance survey and laboratory analysis. Thus the experimental work has been divided into two steps.*

*A socio-agro-economic survey work of the Jabar watershed situated at Jhalda II Block of Purulia District was carried out with a view to know the impact of IWMP on the financial and social structure of farmers. The survey was conducted on 52 farmers (10% of whole farm families) and randomly selected from four micro watersheds of Jhalda II block of Purulia District. In spite of variations in adoption by the farmers, their response was positive with regard to impact of IWMP on different issues.*

*Secondly one hundred and eight soil samples from different land situations of different micro watersheds present in the Jabar watershed were collected from 0 to 45cm depth of soil and analysed in the laboratory to know variation in Particle size distribution and organic carbon content of soil. The study on watershed health factors revealed that irrespective of land situations silt and clay content increased with the depth of soil profiles. The trend of accumulation of clay and silt was observed in Bahal and Kanali lands. The silt and clay particles migrated from higher to lower elevation with respect to land situations. Sand content remained highest in top soil at tar lands. Irrespective of land situations organic carbon content decreased with increase in depth of soil profiles. Results also showed highest amount of organic carbon in Bahal land situations. Amongst the micro watersheds KARCHE micro watershed revealed the degradation with respect to aforesaid health factors and it requires soil conservation measures immediately.*

## 1. INTRODUCTION

Integrated Watershed Management Programme (IWMP) is a project of the watershed community with Government's participation. The IWMP is implemented on prioritized micro watershed basis having its area around 1000 hectares. The IWMP of Jabar Watershed started in 2011-2012 and it will end on 2017-2018.

The Jabar Watershed falls under the Chitmu and Majhidih Gram Panchayat in the Jhalda II Block in the district of Purulia in the state of West Bengal. The geographical area of the Micro watershed is 4919.75 ha comprising of 2 nos. of Gram Panchayat which in turn consists of 26Nos. of villages/Mouza. This micro watershed comes under Red and Lateritic sub region (Agro climatic sub region) with an average annual rainfall of 1225 mm spread over an average of 65 rainy days and the mean summer and winter temperature of 40°C & 18 ˚ C respectively. Total effective project area under the micro watershed is 3700 ha. Almost the entire region is mono cropped, and only a part of it is irrigated. The soil is very shallow with coarse to medium texture, pH ranging from 5.5 to 6.5. Almost 80% of the area of the micro watershed is well drained.

## 2. OBJECTIVES:

To investigate the awareness of the farmers of the Jabar Watershed regarding IWMP and Soil Water Conservation measures.

To investigate the impact of IWMP of Jabar Watershed on some selected watershed health factors.

## 3. THE METHODS

The detailed site-specific survey of the area was conducted, along with available data for the past years being incorporated into the scope of study. Following which the subject was interpreted with questionnaire method (Ex-post factor research design) and the findings obtained were enumerated below and also measures taken up under the purview of the IWMP. While surveying continued, on the spot sampling were done in respect to soil samples of four micro watersheds e.g. Karche, Bararola, Belamu & Simni, from three horizons of 0 to 45 cm depth of three different land situations as they are termed in local language (e.g. TAR- BAID, KANALI & BAHAL) to know particle size distribution pattern along with variations in organic matter content. Altogether one hundred and eight soil samples were collected. The particle size analysis was carried out by the hydrometer method (Buoycos, 1936) using 0.5(m) sodium acetate as the dispersing agent. Oxidisable organic carbon was estimated by following methods of Walkley and Black (Jackson, 1973). Statistical analyses of data on soil

properties and on survey of the respondents were done following methods described by Gomez, K.A. and Gomez, A.A. (1983).

## 4. RESULTS AND DISCUSSION

Distribution of sand particles in soils collected from profiles under different land situations of different microwatersheds revealed that irrespective of land situations and micro watersheds sand content decreased with increase in depth of soil profiles (Fig.1). The lowest amount of sand was recorded under Bahal situations and the highest in soil profile under Tar-Baid situations. It was also observed that Karche micro watershed registered the highest sand content of the top soils amongst all the micro watersheds. This is an expected trend of results. Migration of sand particles is restricted from higher to lower situations.

Distribution of silt particles in soils collected from profiles under different land situations of different micro watersheds can be seen through the Figure No.2. Result revealed that with increase in depth of soil profiles, silt content decreased in all land situations except Bahal. It further showed that lowest amount of silt was recorded under Tar-Baid situations and the highest in soil profile under Bahal situations. It was also observed that Karche micro watershed registered the highest silt content of the bottom soils amongst all the micro watersheds. This is an expected trend of results and the analytical result pointed out the migration of silt particles is from higher to lower elevation with respect to land situations.

Distribution of clay particles in soils collected from profiles under different land situations of different micro watersheds is presented in Fig.3. Result revealed that irrespective of land situations and micro watersheds the clay amount increased with increase in depth of soil profiles. It also showed that irrespective of depth of soil profile highest amount of clay was recorded under Bahal situations. It was also observed that Karche micro watershed registered the highest clay content of the Bahal soils amongst all the micro watersheds. This is an expected trend of results. A result thus clearly pointed out that land situation has a direct effect on accumulation of clay in soil. Clay particles are migrated by the effect of water from Tar-Baid to bahal, the lowest elevation in watershed. This trend of result was earlier observed by Sharma et al (1997).

Changes in organic carbon in soils collected from different soil profiles under different land situations can be seen through Fig. 4. Result revealed that irrespective of land situations and micro watersheds organic carbon content decreased with increase in depth of soil profiles. It further showed that highest amount of organic carbon was accumulated in surface horizons of soil profiles. This trend of result was found in soils under all land situations in all microwatersheds. The observed results pointed out that the surface soil accumulated highest amount of organic matter. It is also found that highest amount of organic carbon

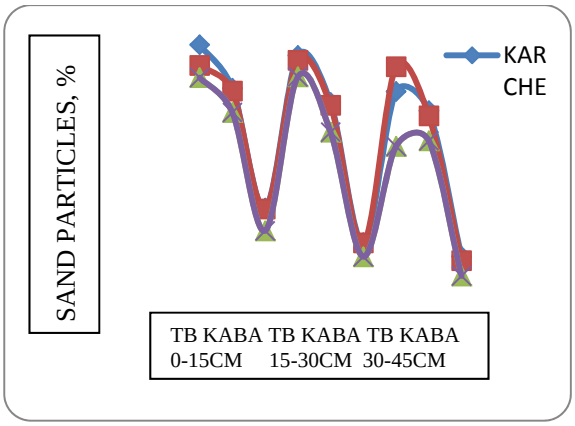


**FIG. 1: Distribution of sand particles (%) in soils of 0 to 45cm depth under Tar-Baid(TB),Kanali(KA) & Bahal(BA) land situations of different microwatersheds of Jabar watershed in Purulia District.**

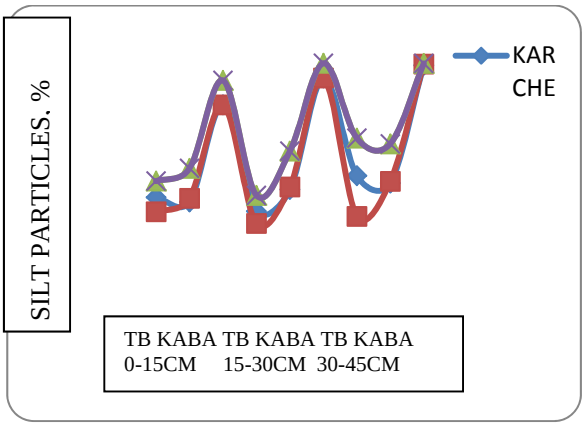


**Fig. 2: Distribution of silt particles (%) in soils of 0 to 45cm depth under Tar-Baid(TB),Kanali(KA) & Bahal(BA) land situations of different microwatersheds of Jabar watershed in Purulia District.**

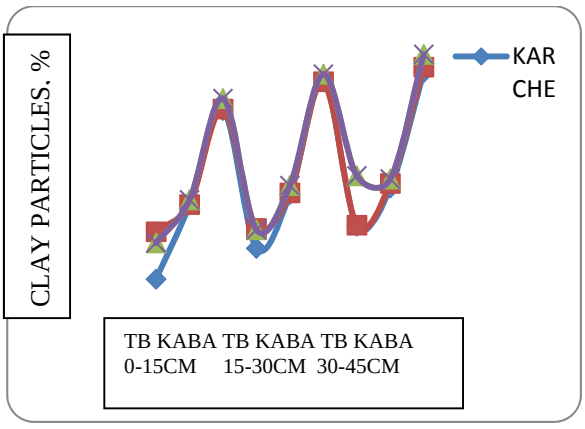


**Fig. 3: Distribution of clay particles (%) in soils of 0 to 45cm depth under Tar-Baid(TB),Kanali(KA) & Bahal(BA) land situations of different microwatersheds of Jabar watershed in Purulia District.**

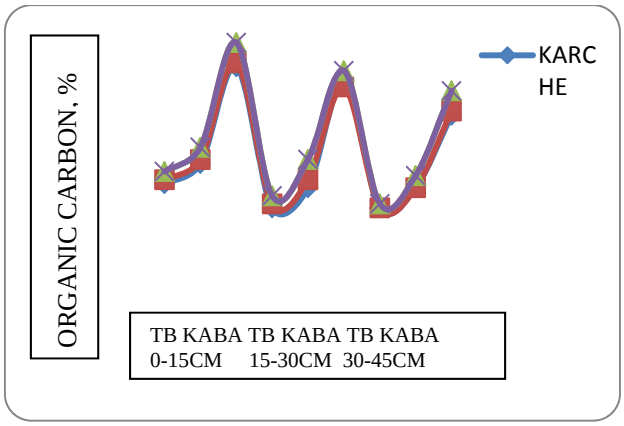


**Fig. 4: Distribution of oxidisable organic carbon (%) in soils of 0 to 45cm depth under Tar-Baid(TB),Kanali(KA) & Bahal(BA) land situations of different microwatersheds of Jabar watershed in Purulia District.**

has been recorded in soil collected from Bahal land situations. It was also observed that Karche micro watershed registered the highest organic carbon content of the soils at Bahal land situations amongst all the micro watersheds. The recorded highest amount of organic carbon in Bahal land situation is due to accumulation of highest concentration of labile organic carbon in the lowest elevation of the watershed under study. This is an expected trend of results. Migration of organic matters is activated from higher to lower situations.

However, the present result can be justified with the report of IWMP at Purulia (Anonymous, 2014), wherein it was reported that highest sheet erosion occurred in Karche micro watershed of the Jabar watershed of Purulia District.

The post implementation survey studies revealed that majority of farmers (94.4 %) were fully aware of the IWMP followed by 5.6 % partly aware and none being unaware. Majority of the farmers (71 %) replied that fifty percent of their own holdings have been reclaimed with, while 26.92 percent denied. So on average sizeable land holdings have attained reclamation presumably. The production potential of crops is moderate as 69.23 % reported it to be good. The idea of Erosion Resistive crops is known but they don't apply it. 21.15 % farmers are using leguminous crops and they use it mostly in Rabi season. The knowledge of shelter belts is known among farmers that are contributing to 67.3 %. The farmers mostly used shelter belts for Rabi season crops and home consumption only. Most of the farmers knew about the run off but they know vaguely about the composition and how they affect the field, contributing it to 69.23% of the farmers.

It can be concluded here that notwithstanding positive response found after three years of implementation of IWMP, the KARCHE micro watershed revealed the degradation with respect to aforesaid health factors and it requires soil conservation measures immediately.

## 5. ACKNOWLEDGEMENTS

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