A field experiment was conducted during rabi 2007-08 to 2008-09 at the instructional farm of Cooch Behar Krishi Vigyan Kendra, Uttar Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, West Bengal to study the growth and productivity of yellow sarson under different nutrient management practice and pre-sowing seed soaking. The experimental soil was sandy loam in texture with low available nitrogen, medium available phosphorus, low available potassium with high level of available sulphur and slightly acidic in reaction (pH 6.14). In this experiment residual effect of the treatments on soil fertility have also been studied. The experiment was laid out in factorial randomized block design with twenty four treatment combinations and replicated thrice.

The results showed marked improvement in growth attributes, yield components, productivity and economics of yellow sarson due to integrated nutrient management and pre-sowing soaking of seeds. Plant height, number of primary branches plant\(^{-1}\), leaf area index, leaf area duration, dry matter accumulation, crop growth rate, root growth, yield components and crop productivity increased markedly with better photosynthetic activities due to the integrated nutrient management consisting 75% of the recommended dose (recommended dose-60:30:30 kg N:P\(_2\)O\(_5\):K\(_2\)O kg ha\(^{-1}\)), FYM(5t ha\(^{-1}\)), *Azotobacter* (5kg ha\(^{-1}\)) and P.S.B (5kg ha\(^{-1}\)). This nutrient management practice also had greater impact in production economics, sustenance in soil fertility and enrichment of soil nutrients. The crop receiving plant nutrients only from chemical sources showed poor growth and productivity leading to less remuneration. Better seed oil content (41.80% and 42.19% in 2007-08 and 2008-09 respectively) was obtained with the application of 100% of the recommended dose (60:30:30 kg N:P\(_2\)O\(_5\):K\(_2\)O kg ha\(^{-1}\)) along with sulphur (20 kg ha\(^{-1}\)) but the oil yield was not impressive due to poor seed yield.
Pre-sowing soaking of seeds with 100ppm KH$_2$PO$_4$ also showed improvement in the emergence, growth attributes in almost all the crop growth stages, root growth, yield components, productivity and oil yield of the yellow sarson crop with better photosynthetic activities compared to seeds soaked with 100ppm Na$_2$HPO$_4$ and water. Seed soaking did not have any significant effect on 1000-seed weight and oil content of yellow sarson. Increased net return and return rupee$^{-1}$ invested have also been observed where the yellow sarson seeds were soaked with 100ppm KH$_2$PO$_4$ over the other soaking treatments. No such variations in residual fertility have been observed due to seed soaking.

Yellow sarson crop grown with integrated nutrient management practice consisting 75% of the recommended dose of chemical fertilizer along with FYM (5t ha$^{-1}$), Azotobacter (5kg ha$^{-1}$) and P.S.B. (5kg ha$^{-1}$) coupled with seed soaking in 100ppm KH$_2$PO$_4$ confirms to be the best treatment combination from the treatment schedule considered during the study for the terai region of West Bengal in terms of crop growth, productivity, monetary return and sustenance of soil health and nutrient enrichment.