The present investigation was undertaken to investigate the effect of Simbhaoli organic manure (SOM), biofertilizers and chemical fertilizers on growth and yield of *Hordeum vulgare* L. Physicochemical analysis of SOM was analysed for pH, organic carbon, nitrogen, phosphorus and potassium etc. Experiment on the effect of two inoculant *viz.* *Azospirillum brasilense* (NFB) and *Bacillus polymyxa* (PSB) was carried out in laboratory, polythene culture and field of sandy loam soil in RBD plots during 2004-05, 2005-06 and 2006-07 at Agriculture Research Farm, Department of Botany, K (P.G.) College, Simbhaoli, Ghaziabad (U.P.). The experiments were consisted of 4 treatments in lab, 10 treatments in polythene culture and 21 treatments in sandy soil including two bacterial inoculants. The inoculation of both bacteria in combination with SOM, nitrogen and phosphate chemical fertilizers were observed. Effect of biofertilizers, combined application of nitrogen and phosphate in amended with SOM and unamended soil and non inoculated control were studied on barley *Hordeum vulgare* L cv. RD-2053. The field trial was laid down in randomised block design (RBD) in three replications of amended with SOM and unamended soil in plot size (2.5$^2$ m) in 63 (21 x 3) treatments.

Agrobased sugar mills and distilleries are leading industry in India producing press mud cake (PMC) and distillery effluent which is either disposed into lagoon or river through nala causing environmental problems. Simbhaoli Sugar Mill along with distillery
division is one of the 579 sugar mills and 300+ distilleries in India which manufactured press mud cake and distillery effluent into Simbhaoli Organic Manure (SOM) to reduce, reuse and recycle (3 R’s) for environmental conservation.

Meteorological parameters (temp, humidity and rainfall) were recorded to observed the holistic effect of SOM, biofertilizers and chemical fertilizers on Hordeum vulgare L. Being one of the most important cereal of subtropical world is preferred to wheat under adverse condition of soil, water and climate and used in malt industries. The crop requires less water and can tolerate salinity and sodicity.

The observations were recorded on various morphological, physiological, biochemical and post harvest parameters at different stages of plant growth. The results were recorded on seed germination (%), germination relative index (G.R.I.), radicle and plumule length, phytomass of plant (mg), vigour index and net primary productivity in laboratory. Experiments in polythene culture and field were recorded on plant height, no. of tillers plant⁻¹, grains yield and yield component at 30, 60 and 90 days after inoculation of Azospirillum brasilense (NFB) and Bacillus polymyxa (PSB) amended soil with SOM/FYM and unamended soil and non inoculated control. Phytosociology of weeds and soil was studied with philosophy ‘feed the soil to feed the plant’ for sustainable agriculture.

Seed germination (%), G.R.I., radicle & plumule length of seedlings and phytomass represent primary events in the life cycle of plant. The biofertilizers had promotive effect on seed germination %
in NFB, PSB and NFB + PSB significantly over control. SOM with biofertilizers were observed superior over control than FYM in polythene bag. Because biofertilizers secreted growth substances and secondary metabolites which help in germination, growth physiology and yield of *Hordeum vulgare* L. under field condition which might be summarised as under:

1. Germination %, G.R.I., radicle and plumule length amended soil with NFB and PSB was highly significant than unamended soil control.

2. Incoulated with NFB or PSB and their simultaneous inoculation in amended soil significantly increase the plant height at different stages as comparison to unamended uninoculated control.

3. The bacterial inoculation alone and in combination with chemical fertilizers enhanced dry matter production, leaf area over control at all stage during three years (2004-05, 2005-06, 2006-07).

4. The extend duration of both phenophases (sowing to flowering to maturity) were recorded increased due to vegetative growth in inoculation of NFB and PSB and their interaction with chemical fertilizers in amended soil over control.

5. Chlorophyll content was increased significantly due to inoculation of NFB, PSB and their simultaneous application with chemical fertilizer in amended soil than control.

6. Total chlorophyll (chl. ‘a’ + chl. ‘b’) of flag leaf increased significantly in NFB + PSB, NFB + N% and NFB with P2O5 than
PSB and control in unamended soil and showed source and sink relationship with maturity of grains in spike.

7. The nitrate reductase activity (NRA) was recorded high in plant foliage bacterial inoculant and their combinations with chemical fertilizers in amended soil than control.

8. The number of tillers was increased significantly due to inoculation of NFB + PSB and their combinations with chemical fertilizers in amended soil than control. The increase of ear length, no. of spikelets spike⁻¹, grains no. of spike, seed yield plant⁻¹ were recorded inoculated with NFB, PSB and NFB + PSB with chemical fertilizers (C.F.) in amended soil over control.

9. The bacterial (NFB and PSB) inoculation in combination with C.F. recorded high grain yield plant⁻¹ and improve yield attributes over single inoculation in amended soil. The grain yield was recorded more in soil amended with biofertilizers treatment of inoculated with NFB + 50 % N than RDF. Thus with NFB in amended soil the inoculation of Azospirillum can save at 50 % N by inoculation with NFB and SOM.

10. Harvest index was significantly higher in bacterial inoculation and chemical fertilizers in amended soil than control.

11. The effect of biofertilizers, chemical fertilizer and organic manure on phytosociology of 15 species of weeds 12 dicots and 3 monocots were studied for relative dominance, relative density and importance value index (I.V.I.). Maximum I.V.I. was exhibited by Jusssea octovalis (80.25), Stellaria media (41.42) and monocot Cyprus rotundus (54.20) over other
weeds. Highest occurrence of species in PSB + 40 % P and PSB in amended soil and highest density in inoculated NFB soil were recorded.

12. The four most common early colonizers in seed bank were 

*Jussiaea octovalis*, *Gnaphalium indicum*, *Stellaria media* and *Cyprus rotundus* was with highest I.V.I. in NFB unamended and NFB + PSB amended soil.

13. Inoculation of biofertilizers (NFB + PSB) in amended soil in polythene culture with SOM showed better growth and yield as well as improved soil fertility than use of biofertilizers alone or even with FYM over control. Vegetative growth of barley plant was found more in SOM amended soil inoculated with NFB + PSB as compared to FYM. The effect was also higher than R.D.F. (Recommended Dose of Fertilizers).

14. SOM was found superior to FYM. Further it was observed that instead of using organic manure (SOM) and NFB + PSB treated soil plus half of the required calculated N.P.K. was found to be more promising.

15. DSW does quick decomposition of leaf compost (fallen leaves and flowers) in five temperature based composting phases and earthworms casting in compost applied pot showed greening your environment at home.

Organic manure from press mud and distillery effluent will reduce aquatic load on water reservoirs to manage water budget in country. Thus it concluded that integrated approach of organic manure, biofertilizers and chemical fertilizers, organic manure
SOM/FYM with biofertilizers (NFB + PSB) treated seeds plus chemical fertilizers help to increase productivity and soil fertility (soil health management). It would curtailed demand (half) of chemical fertilizers as well as cascading effect on price inflation and check soil pollution (salinity) which will lead to mission of sustainable development.

The integrated nutrient management system not only arranged marriage between environment and economy for growth rate and GDP from 9.5 to 10 % in 11th five year plan but would have also be action for global challenges for “Vision 2020” of developed New India.