Summary
Rice is a staple crop for nearly half the world’s population. The wetland soils of rice paddies are ideal for microbes that produce methane, which trails only carbon dioxide in terms of its green house effect. Rice production currently accounts for approximately 13% of global methane emissions.

Methane in rice field favors the growth of a group of microorganism as *Methyloptrophs*. They are physiologically interesting group of bacteria that have been isolated from many plant species. Some genus of these groups is pink or orange pigmented due to the presence of carotenoid pigment. Because of their characteristic pink color colonies in culture and their ability to grow on methanol, in addition to other carbon compounds, they are referred as pink pigmented facultative *Methyloptrophs*. The organism is not obligate methane eaters as facultative organisms.

*Methylobacterium* is characterized by morphological and biochemical characterization. They can grow in the optimum PH at 7.0 and their optimum temperature is 37°C . The organism can grow in various substrates like methanol, ethanol, Pyruvate, acetone, oxalate, glycerol, and fumarate.
The optimum growth of the organism is obtained in at 14\textsuperscript{th} hour of incubation. During the growth in glycerol peptone agar and ammonium mineral salt agar, growth is restricted because of the presence of glycerol and minerals. New media is formulated in methanol peptone agar. The mass production of the organism can be done in methanol peptone agar to prepare Bioinoculant.

Formulations for Bioinoculant were done using jaggery, gum arabic, calcium carbonate, and farm yard manure. For better attachment of microorganism with the seeds, an adhesive like gum arabic is used. Seed is germinated in petriplates using culture cotton method which is new method introduced in this research work. This method is only applicable for laboratory studies. For field trials foliar spray and rhizosphere applications are generally used.

Methylobacterium produces growth hormones Auxin and cytokinins. In addition with that it produces vitamins. These growth factors help in seed germination and yield. These bacteria have been demonstrated to contribute to plant metabolism in a number of important ways including production of enzymes, stimulation of germination and enhancement of growth.

Productivity studies have been performed for Methylobacterium in different seed samples. Agrobacterial characters are very effective on plants when compared to control. Methylobacterium also involves in plant defense mechanism. It inhibited the growth of other plant pathogen growth when plants are grown with Methylobacterium
On the whole the research work clearly revealed that three potential characters were found in *Methylobacterium*. By utilizing methane, organism involves in ecological balance and reduces global warming. So using *Methylobacterium* has more social impact than other fertilizers. By producing growth hormones it directly have impact on plant growth by promoting the germination, root length, and shoot length and dry matter. By producing plant pathogen related protein, they effectively involves in defense mechanism of the plants. The two methods Besides all the efficacy of *Methylobacterium*, methane reduction and crop productivity has more social impact compared to other organism.