

Leica Geosystems **TruStory** Precise Land Leveling in India using Leica Geosystems Laser



Laser Land Leveling in India.

Declining water table and degrading soil health are the major concerns for the current growth rate and sustainability of Indian Agriculture. Thus proper emphasis is being given on the management of irrigation water usage for adequate growth of agriculture. Keeping in view, the need for judicious use of our natural resources, concerted efforts are being made to enlighten the farmers for efficient use of irrigation water at farm level. Generally, in rice-wheat rotation farmers believed that their fields are leveled and needed no further leveling. But the digital elevation survey sheet of a field shows that the most of the fields are not adequately leveled and requires further precision land leveling.

The enhancement of water use efficiency and farm productivity at field level is one of the best options

to redress the problem of declining water level in the state. The planner and policy maker are properly informed and motivated to develop strategies and programs for efficient utilization of available water resources. Laser Land leveling is one such important technology for using water efficiently as it reduces irrigation time and enhances productivity not only of water but also of other non-water farm inputs. Results in technologically advanced countries have indicated that saves water to the tune of 25-30% and time by 30% and also improves the productivity by 10-15%. It has also been observed that with Laser Land Leveling 2-3% effective cropped area in case of flat fields and even more in ridge sown fields become available for cultivation of crops, as the number of bunds and irrigation channels get reduced considerably.

Benefits of Land Leveling

Effective land leveling reduces the work in crop establishment & crop management, and increases the yield and quality. Level land improves water coverage that Improves crop establishment, reduces weed problems, improves uniformity of crop maturity, decreases the time to complete tasks and reduces the amount of water required for land preparation.

Leica Rugby used for Laser Land Leveling Systems provide benefit to the farmers by precisely leveling the farm lands which leads to the following benefits:

- Optimization of water use efficiency
- Better crop establishment
- Less Time and Water required in Irrigation
- Less effort in crop management
- Less weed problems
- Uniformity in crop maturity
- Time efficiency in completion of task
- Easy land preparation
- Less water requirement for land preparation
- Reduced consumption of seeds, fertilizers, chemicals and fuel
- Increase in farming area
- Assist top soil management
- Saves fuel / electricity used in irrigation
- More uniform moisture environment for crops
- Good germination and growth of crop
- Improved field traffic ability for the subsequent field operations

What is Laser Land Leveling?

Laser leveling is a user guided precision leveling technique used for achieving very fine leveling with desired grade on the agricultural field. Laser leveling uses a laser transmitter unit that constantly emits 360° rotating beam parallel to the required field plane. This beam is received by a laser receiver (receiving unit) fitted on a mast on the scraper unit. The signal received is converted into cut and fill level adjustments and the corresponding changes in scraper level are carried out automatically by a two way hydraulic control valve.

Laser leveling maintains the grade by automatically performing the cutting and leveling operations. Both level grade and slope grade (one way or two way) can be achieved with the help of this precision equipment. The field is cultivated and planked before using the Laser Land Leveler. A grid survey is performed using grade rod to identify highs and lows in the field and mean grade is found. A grid spacing of 10m x 10m is maintained for accurate land survey; however this spacing can be varied depending upon the size of the field.

For practical purposes and with experience, grid survey can be done by pacing off the distances rather than (measuring). A map is then drawn to indicate which areas are

high; require soil to be cut and the lows which require soil to be added.

Why precise Land Leveling using Laser Based Land Leveling Systems?

Unevenness of the soil surface has a major impact on the germination, stand and yield of crops through nutrient water interaction and salt and soil moisture distribution pattern. Land leveling is a precursor to good agronomic, soil and crop management practices. Resource conserving technologies perform better on well leveled and laid-out fields.



Farmers recognize this and therefore devote considerable attention and resources in leveling their fields properly. However, traditional methods of leveling land are not only more cumbersome and time consuming but more expensive as well. Very often most rice farmers level their fields under ponded water conditions. The others dry level their fields and check level by ponding water. Thus in the process of having good leveling in fields, a considerable amount of water is wasted.

It is a common knowledge that most of the farmers apply irrigation water until all the parcels are fully wetted and covered with a thin sheet of water. Studies have indicated that a significant (20-25%) amount of irrigation water is lost during its application at the farm due to poor farm designing and unevenness of the fields. This problem is more pronounced in the case of rice fields. Unevenness of fields leads to inefficient use of irrigation water and also delays tillage and crop establishment options. Fields that are not leveled have uneven crop stands, increased weed burdens and uneven maturing of crops.

All these factors tend to contribute to reduced yield and grain quality which reduce the potential farm gate income. Effective land leveling is meant to optimize water-use efficiency, improve crop establishment, reduce the irrigation time and effort required to manage crop.

