2. The spray pressure used

Other factors remaining constant, increasing the spray pressure results in a greater volume of carrier applied to a given area. Conversely, a lower spray pressure results in less carrier applied. In general, spray pressures of 15 to 40 pounds per square inch (PSI) are used when herbicides are applied. Spray droplets become smaller as the spray pressure is increased. The smaller the spray droplets, the greater is their tendency to drift from the target area with air movement.

3. The number of nozzles used

While other factors remaining constant, an increase in the number of nozzles used with the sprayer results in increased sprayer output. Added, nozzles, however, do not necessarily increase the volume per acre applied. They increase the area covered during each pass of the sprayer.

4. The size of nozzle orifice (opening)

Other factors remaining constant, the use of large-size orifice nozzle tips results in a greater volume of carrier being applied to a given area. Sprayer droplets also become bigger.

5. The viscosity of the liquid

Other factors remaining constant, the lower the viscosity of the liquid carrier (or spray mixture) the greater the volume of carrier (or spray mixture) applied to a given area. Conversely, the greater the viscosity the less carrier applied. The viscosity of the water carrier is not altered significantly by the addition of herbicide formulations

CALIBRATION OF HAND SPRAYERS

The following procedures may be used to calibrate a sprayer having relatively a small spray-tank capacity, such as 10 to 20 liters size commonly carried on the shoulder, or as a backpack.

PROCEDURE-I

1. Fill the spray tank completely with water or to an accurately measured depth preferably with a known volume of water.
2. Mark off any covenient distance in field to be sprayed. Generally, the greater the distance the greater is the accuracy in determining sprayer out put.
3. Close spray tank and pump up pressure until pressure reaches 40 PSI.
4. Make one or more passes with the sprayer over the measured distance at the constant speed (usually between 2 and 5 mph), operating the spray only over the measured distance. Care must be taken to see that speed and pressure do not vary significantly from the calibration test to the actual field spraying.
5. Determine the number of square feet (or square meter) in the sprayed area by multiplying the width of the area sprayed by the distance travelled (sprayed).

6. Determine the volume of water applied to the area by refilling the spray tank to its original water level by adding water from a measuring container or determine the volume of water applied by subtracting the amount of water remaining in the spray tank from the amount originally poured in the tank. (Drain water remaining in spray-lance and hose back into spray tank before measuring amount of water applied).

7. Compute the water applied per acre (or hectare) dividing the area of one acre (or ha.) by the area sprayed and then multiplying by water used.

$$\text{Water used per acre or ha} = \frac{\text{Area of an acre or ha}}{\text{Area sprayed}} \times \text{Quantity of water used on sprayed area}$$

8. For greater accuracy, repeat the above procedure several times and average the sprayer output.

PROCEDURE-II

1. Fill the sprayer tank with water.
2. Do pumping until pressure reaches 40 PSI.
3. Spray water in a container at a constant pressure.
4. Continue spraying for one minute exactly. Repeat this for 3 times to obtain the average nozzle discharge/minute.
5. Measure the water in the container.
6. If the water collected is one liter, then the nozzle delivery of the sprayer is one litre/minute or 60 litres/hour.
7. Determine the speed of walking. An average age man can walk 65 m in one minute in a field with a sprayer on his back.
8. Determine the distance (width) which the spray can cover in one swath. Keep the distance between nozzle and ground level constant while measuring width of spray swath. The width of the swath can clearly be seen on a dry path.
9. Determine the area which can be covered in one swath or passing by multiplying spray swath (width) and distance travelled (length) after 1 minute.
10. Determine the time necessary to spray one acre or ha. by applying this computation.

$$\text{Total time needed to spray an acre} = \frac{\text{Area of an acre in square feet}}{\text{Area sprayed(sq.ft)}} \times \text{time}$$

11. Determine the amount of water applied in an acre by using the following computation.

Total amount of H_2O applied in an acre = Nozzle delivery x time to spray an acre

12. Calculate the amount of herbicide to be added to the tank.

$$\text{Amount of herbicide/tank} = \frac{\text{Tank capacity}}{\text{Water needed to spray}} \times \text{Recommended dose of herbicide for one acre}$$

DETERMINING WALKING SPEED OF SPRAY MAN

1. Mark starting point with a stake in a field planted with the crops to be sprayed.
2. The sprayer should be carried on the back and operated by pumping while directing lance and nozzle at the target. Walk exactly one minute, while some one else reads the time on a watch. aWalk at a normal and constant speed.
3. When one minute has expired, mark stopping point with another stake and measure the distance between Ist and 2nd stake in meters or feet.
4. Repeat this action 3 times to obtain average walking speed.

CALIBRATION OF TRACTOR MOUNTED SPRAYER

Method-I

By spraying a known quantity of water on an area.

1. Fill the tank with a known quantity of water, say 10 gallons.
2. Take the tractor to the test field area.
3. Put flags or pegs or marker at the known distances, say one flag at 10 feet interval.
4. Attain the pressure in the tank desired for spray.
5. Start the tractor and attain the speed at which field is to be sprayed, say 3 mph.
6. Open the nozzles to spray and spray the known quantity of water.
7. Measure the width of spray swath.
8. Measure the distance travelled by the tractor to spray added quantity of water.
9. Calculate the area sprayed by multiplying width of spray swath and distance travelled by tractor.
10. Calculate the quantity of water used per acre by the following formula.