Traditional agricultural tools—A review

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Agricultural tools are as old as the Stone age. They were required to facilitate working and to increase the productivity of human workers. New tools were developed during copper, bronze and iron ages. Besides stones, other non-metals like wood, leather, bamboo and fibres were used in tools but most of them became extinct with the introduction of iron.

Starting with the earliest iron Bakhar blade for tillage in central India after the discovery of iron smelting in mud hearth in Bastar of Chattisgarh state, agricultural tools were designed and produced in scores by village blacksmiths. Some of the hand tools made of iron are now being mass-produced in small-scale industries using modern system of production for economy and quality.

All trades of village artisanship in black-smithy, carpentry, cobbler, pottery and other craft in bamboo, stone, etc. contributed to the design and development of agricultural tools through artisan’s ingenuity. Examples have been cited here covering large trades of artisanship. Sickles, Khurpi and other small hand tools were the age-old traditional devices developed by blacksmiths. Carpenters made the counterpoise to lift water from wells to irrigate crops. Big size earthenware was made by potters to store grains for months to be safe from insects and pests. Cobbblers were not left behind. They used whole skins of animals to carry water to irrigate horticultural crops besides watering dusty roads. Bamboo craftsman also contributed in developing entire range of food processing and storage structures like sieve to clean grains, baskets to transport and store vegetables, etc. Stones craftsman also made mills to grind wheat to make flours and pulses to make Dhal and similarly mortar and pestle to make paste of spices, etc. Today big mills are making these pastes to re-introduce the traditional taste and flavour of recipes. A dozen of precision hand tools are being manufactured for improved quality and finish by a score of small scale industries; traditional sickles and Khurpi by a million artisan shops in country side and several manual and animal drawn tools by about 18 thousand small industries.

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More than 12 thousand years ago, human being particularly in tropics started using tools of white granite stones in hunting animals as well as in dressing them. The pointed stone tools were fixed to the ends of spear and arrow. Gradually they turned from hunting to fishing and then to cultivation when stone tools were used to manually open up land to sow seeds, remove weeds and cut ripe crops. Metals were discovered first as soft metals like copper, lead, tin and gold followed by alloy like brass and bronze and then hard metal like iron. Soil was moulded to bricks and burnt for hardness to build houses followed by earthenwares and terracota potteries. Bastar area pioneered introduction of Bell metal casting and iron smelting. Craftsmanship and artisanship grew stronger and stronger as professions resulting in development of crafts and skills so much so that agriculture was blessed with the present day khurpi and sickle.

India and her culture were reflected through her skilled craftsmen and artisans from Iran in the West to Myanmar in the East. The world’s early civilizations on Euphrates, Tigris, Niles, Indus Valley and China were great because of their rich craftsmanship and artisanship, thus establishing their leadership in science and technology.

Although agricultural hand tools were developed from the era of stone age some twelve thousand years ago, the recorded evidence of such development came to light from around two thousand years from now from the sample of iron made Bakhar blade found in central India. Bastar was famous for bell metal technology and lost-wax method (present day investment casting) of metal casting.

As human civilization developed and grew up, artisanship and craftsmanship also grew up as family traits, profession and means of livelihood. Forging and fabrication were common practice for black smiths and moulding for goldsmiths. As agriculture
was the mainstay of the population, farmers required hand tools to do work, improve labour productivity, and quality of work. In fact, the introduction of iron made all the difference in developing hand tools. Except improving forging technique and metallurgy of tools and a few other new ones, there was no drastic change in the development of agricultural tools till the turn of twentieth century.

The industrial revolution in Great Britain and Europe brought about overall changes in industries with the introduction of prime movers. This revolution had its impact in other allied fields including agriculture and its mechanisation. Some progressive Indian farmers imported a few tools and machines, and tried in their fields. Considering the need of mechanisation in agriculture, some ventured to manufacture a few implements at the beginning of twentieth century. One such implement was bullock-drawn turn-rest one-bottom iron plough. The 20 cm plough was considered an improvement over traditional bullock-drawn wooden plough of 10 cm bottom in respect of capacity and turning both ways.

Prior to the recorded evidence of bakhar, the Hindu epic Ramayana has mentioned the use of plough. A fresh development in new designs of implements and tools was noticed around independence. During this period, the traditional tools experienced improvement in design and metallurgy. A large number of traditional tools have appeared in a survey report.

During mid-sixties and onwards, some big industries stepped into the business of manufacturing a few selected traditional tools and tools imported from the West.

**Designs of Tools**

**Stone-mill**

There is no recorded evidence of its first introduction. But certainly one can imagine this is a gradual forward development of granite seel-batta—the flat rectangular stone on which another cylindrical stone grinds spices, etc. into thin paste. The milling stone was used to grind whole pulses to make Dhal. The top circular stone is rotated on a pivot by right hand using a fixed wooden peg over the heavy circular base while the left hand slowly pours grains into a hole on top half. The rubbing of the grains by the two flat stones causes splitting and removal of husk. The milling stone is used to grind wheat.

**Earthen grain-storage wares**

Potters started moulding earthenwares by hand as well as by beating with a wooden mallet from clay. Big-size bottle-plump wares were used to store water. Farmers used earthenwares of this type as well as of cuboids type to store grains. There is an outlet at the bottom to empty the ware.

**Straw pora**

In the rice growing area of southern and eastern India, paddy was and is still stored in pora. Long ropes of two-inches in diameter are manually made out of rice straw. The ropes are then wound around rice straw to form a cylinder into which paddy is gradually poured. This sort of storage bins keeps paddy unaffected for 4 to 5 years from attack of insects and pests. Making pora is an ancient craftsmanship.

**Bamboo sieve**

In early days, for cleaning, sieving and packaging, many devices made up of Bamboo were used. Some of them are still in use (Figs. 8-11). One such device is the sieve or Chhalna that separates dust, stones and other foreign matters.

**Skin water bags**

Whole animal skin was processed and used for carrying water to short distances on shoulder for purpose of watering horticultural and vegetable crops in arid zones. The bags were originally used for watering dusty roads and at construction sites. The whole-skin leather bags were the handiwork of cobblers. Even today, the same is used in bellows to ignite hearth by blacksmiths in forging iron.

**Wooden counterpoise**

This device is to lift water from wells to irrigate crops (Figs. 1, 15). The earthen pitcher is hung from one end and a weight tied on the other of a long bamboo pole that counterpoises on to a pair of erect logs. The pitcher collects water from well/ deep nullah / ditch by up and down action of the counter-weight by a worker. This irrigation device, the handiwork of village-artisan carpenter, stands till to day to farmer’s use. The device is the handiwork of village artisan-carpenter.

With passage of time, stone, bamboo, wood, clay and leather gave way to metals. Amongst metals, iron became the most popular because of its cost, strength and durability. From craftsmanship, the trade and skill changed to artisanship in blacksmithy. Amongst all metals, iron dominated in making war weapons along with tools for domestic and agricultural uses.
Even today, we come across roadside blacksmiths engaged in hot forging of iron scrap sections into a variety of tools like knife, chopper, axe, **daa**, crowbar, pick-axe, small **kodali**, **phaora**, awl, rake, **khurpi**, blades of **bakhar**, **kulfa** and a large number of other items used in agriculture.

**Bakhar**

This bullock-drawn implement of central India dates back to Buddha period as evident from a sample of its blade discovered in an archaeological excavation at Sanchi stupa. The wide and curved iron blade held by two iron bars at ends and fixed into a wooden log does shallow ploughing, breaks clods and partially levels the field (Fig. 2). Today we find this age-old implement in parts of Gujarat, Maharashtra, Madhya Pradesh, Andhra Pradesh and Karnataka. **Kulfa** is another such implement like **bakhar** to do intercultural operation.

**Sickle**

This is one of the most popular multi-use tools that our ancestors used in agriculture (Fig. 3). Primarily designed to do harvesting of crops, the sickle also performed cutting **chara** for animals, bush, and even vegetables in rural homes.

**Bullock cart**

It all began as all-wood transport vehicle pulled by a pair of bullocks or horses (Fig. 4). Later on the wheels were clad with flat steel bars and provided with a steel axle to enhance its life. Thus, this device became a product of mixed-trade.

Since the list is large, the approximate numbers of the agricultural tools have been presented in Table 1 along with their scale of production.

### Production

**Cottage level**

Fabrication of agricultural tools, particularly small ones operated by human hands or feet or by animals started purely as family trade in the form of cottage industries. The skill of the trade passed to next generation mostly as secret trait. Nothing was documented; as a result an outsider could not venture into the same trade. In earlier days, the peacetime activities of soldiers were agriculture. Thus, the blacksmiths who were engaged to make weapons used to make agricultural tools in peacetime. Every artisan shop in early days was, therefore, a cottage industry of agricultural tools. The population of village artisans is above one million, i.e. every village has roughly two artisans². Hot and cold forging of iron on **bhatti** or hearth were the major activities of blacksmith on which rested the trade secret of temperature, colour of heated part and water treatment in hardening and tempering to get the desired result in the tool. As livelihood is very difficult these days, most artisans have now concentrated on roadsides, highways and village market places for better business.

**Tiny industries**

All cottage industries basically labour-intensive are tiny industries. Although investment is very low in artisan shops, the nature of fabrication activity surrounding black smithy of iron and steel classifies them as tiny. The advanced artisan shops use electrical production tools like drill, grinder, and arc-welding machine to produce traditional agricultural tools. Almost 95% of industries that manufacture implements can be addressed as tiny industries, which is often addressed as small-scale sector. So far, their

### Table 1—Traditional agricultural tools and their scale of production

<table>
<thead>
<tr>
<th>Scale of Industries</th>
<th>Traditional tools (type)</th>
<th>Non-traditional tools (type): Including implements and machines</th>
<th>Total number of industries</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cottage industries</td>
<td>75</td>
<td>-</td>
<td>5 000</td>
<td>Wood, bamboo, stone and leather</td>
</tr>
<tr>
<td>Artisans (traditional)</td>
<td>25</td>
<td>-</td>
<td>1 million</td>
<td>Iron, steel and leather</td>
</tr>
<tr>
<td>Advanced artisan shops</td>
<td>15</td>
<td>-</td>
<td>2500</td>
<td>-Do-</td>
</tr>
<tr>
<td>Tiny industries</td>
<td>20</td>
<td>75</td>
<td>10 000</td>
<td>-Do-</td>
</tr>
<tr>
<td>Small scale industries</td>
<td>12</td>
<td>15</td>
<td>500</td>
<td>-Do-</td>
</tr>
<tr>
<td>Medium scale industries</td>
<td>-</td>
<td>5</td>
<td>75</td>
<td>Power-tiller, pump, etc.</td>
</tr>
<tr>
<td>Large scale industries</td>
<td>-</td>
<td>3</td>
<td>18</td>
<td>Tractor, combine, etc.</td>
</tr>
</tbody>
</table>
population has not been ascertained but can be roughly around ten thousand in the country.

**Conclusion**

From the stage of ancient India, traditional knowledge system even in the field of agricultural tools and equipment abounded. Some of these tools are still in abundant use either in original form or with modification as we see in case of articles made from bamboo and wood for lifting water and processing of grain crops besides use of stones. New tools and equipments were developed with the discovery of the metals starting with copper, brass, bronze and finally iron; some of which, have been developed in combination of hard cutting tool with wooden and bamboo handle for ease and lightness. Many of the iron traditional tools have been modified and are being mass produced using modern techniques of production to affordable price and higher life. This abundant store of knowledge in the area of traditional hand tools, their craftsmanship, technique of production and metallurgy are still in practice and of great value. It is our duty to develop, preserve and protect them.

**References**