Cricket Bat Industry as an Economically Viable Livelihood Option in Kashmir: Present Status and Future Prospects

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Abstract

The main objective of this study was to determine whether bat manufacturing units operational in Kashmir were sustainable entrepreneurial ventures or whether they exhibit a declining trend in terms of economic viability. The study also aimed to document the main constraints that confront the cricket bat industry in order to devise future strategies and research needs that can help to exploit the full economic potential of this indigenous wood-based industry. The present study was carried out in a bat manufacturing cluster, which is composed of about 70 units concentrated on the Jammu–Srinagar national highway in the valley of Kashmir (India). Results revealed that the cost of manufacturing cricket bats decreased with the increase in the size of the industrial unit, indicating the existence of ''economies of scale.'' The gross returns earned by small-, medium-, and large-scale units were more than 2.7, 5.0, and 8.2 million rupees (Rs), with benefit-cost ratios (BCRs) of 1.69, 2.05, and 2.29, respectively. The cost and return structure, in relation to various economic indicators such as BCR, net income, breakeven quantity, and export competitiveness, reflects positive trends, and the bat manufacturing activity fetched a reasonable profit to the unit holders, besides providing employment opportunities to youth and thereby reflecting that this entrepreneurial venture is an economically viable livelihood activity. These results indicate that, despite underutilization of installed production capacity, the manufacture of cricket bats is a lucrative venture in Kashmir and can be up-scaled to become highly competitive in terms of its export potential to other countries.

The history of making cricket bats in Kashmir dates back to the 19th century, when Allah Baksh, an industrialist from Pakistan, established his cricket bat unit at Halmulla, Bijbehara, where willow logs were converted into clefts for onward finishing at Sialkot. The initial demand was from the British army officers stationed in the region for colonial rule, and the technical know-how was imported from England (Lawrence 1895). The expansion of this indigenous wood-based industry came into being with the registration of hundreds of manufacturing units established at various places across the Kashmir valley, particularly in District Anantnag and Pulwama (Bhasin 2003). Presently there are about 195 functional units, which directly or indirectly provide employment to about 50,000 people. The industry has a production potential of 1.5 million bats with an annual turnover of 20 million rupees (Rs) per annum (Anonymous 2004). The bats made in Kashmir are not only popular in India, but also in Pakistan, Bangladesh, and Sri Lanka. Further, with projected demand of cricket bats expected to increase to 4 million per annum in the global market by the year 2020, the future of this industry looks very promising because the Kashmir willow comprises about 60 percent of the total bats manufactured in India (Rashid 2007).

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Additionally, with a compound growth rate of about 8.4 percent, the potential turnover from the export of this commodity is projected to increase to 100 million per annum in the year 2030 (Anonymous 2004).

Despite this huge economic potential, the cricket bat industry of Kashmir is presently confronted with many constraints, the most important being the overexploitation of raw material and its illegal export to other states of the country. The report presented by the Directorate of Industries and Commerce, Kashmir, reveals that about 6.7 million willow clefts were exported to cricket bat industries in Jammu, Jalandhar, and Meerut from 1997 to 2004 (Anonymous 2007). These figures are, however, contested by local unit holders, who firmly believe that during the same period, an additional 2.5 million cricket bat clefts were exported to Meerut and Jalandhar under the garb of quota system, tantamounting to tremendous loss of the precious raw material. The supply of quality timber from white willow has thus decreased due to removal of a large number of trees and as such the most preferred variety *caerulea* (*Salix alba* var. *caerulea,* a female counterpart of white willow) is near extermination in Kashmir. Realizing the fact that the precious raw material is exploited indiscriminately, the government of Jammu and Kashmir imposed a ban on the export of raw clefts in 1998. But despite this ban, the law is regularly being flouted and continues to be defied because no measures have been taken to bump the industry up to international standards.

The overexploitation of white willow has resulted in nonavailability of quality raw material, and to sustain the industry, the clefts are now sold at the lower end of the market and fetch US$1.0 to US$2.5 (US dollars presented throughout) per cleft as compared with $40 to $42 per cleft for English willow and $20 to $30 per cleft for Australian willow in the international market. The rough estimates have shown that even if the clefts are sold at a rate of Rs 500 ($9.25) per piece, a farmer will get at least Rs 10,000 to Rs 12,000 ($185 to $222) for 20 to 24 clefts obtained per tree with a sufficient margin for industrialists. Similarly, the cricket bats produced in Kashmir fetch a maximum price of Rs 1,000 to Rs 3,000 ($18.5 to $55.5) per bat compared with English willow bats, which retail from $220 to $450 per bat in the global market. With these constraints in mind, the present study was aimed to find out whether bat manufacturing units operational in Kashmir are economically sustainable entrepreneurial ventures or if they exhibit a declining trend in terms of profitability. The study also aimed to document the main constraints that confront the cricket bat industry so as to devise future strategies and research needs that can help to exploit the full economic potential of this indigenous industry.

Materials and Methods

There are about 195 functional bat manufacturing units in Kashmir valley with the majority of them (114) spread on or around the Jammu–Srinagar National highway. The present study was carried out in a bat manufacturing cluster that comprises about 70 units (Matoo 2009) which are concentrated within the 15-km radius between Khanabal and Awantipora (Fig. 1). Based on the annual production potential of these units, they were classified into three categories, i.e., small-scale (up to 20,000 bats), medium-scale (20,000 to 30,000 bats), and large-scale (30,000 bats and above) units. A representative sample of 28 (40%) of the 70

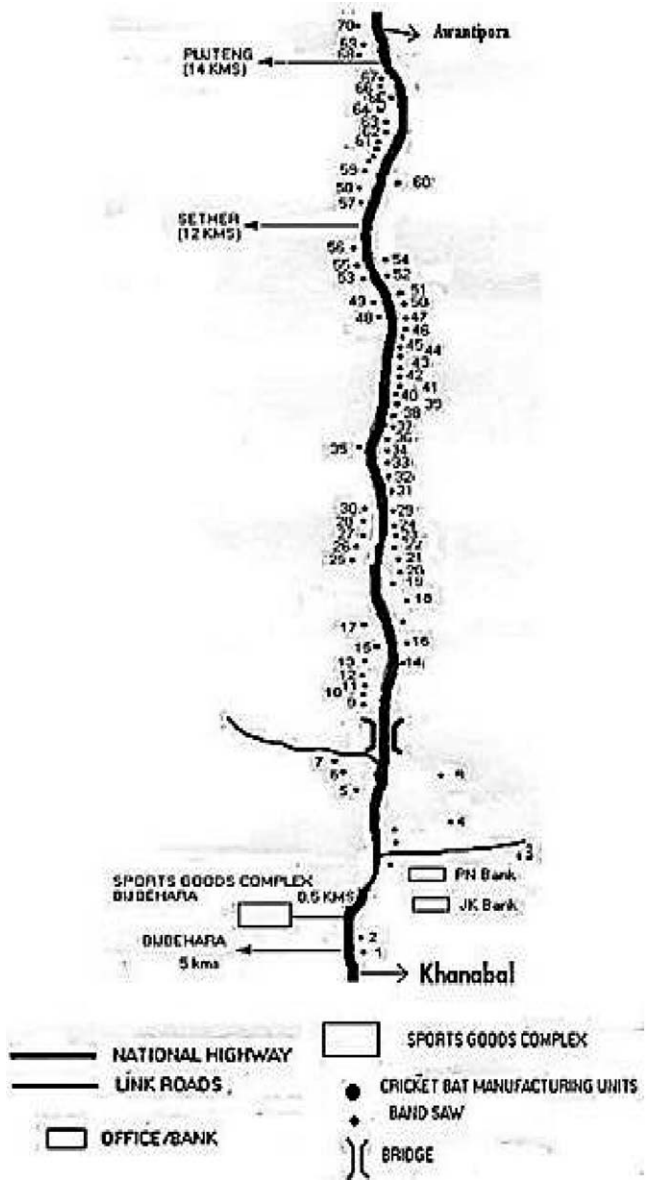

Figure 1.—Cricket bat manufacturing units on and around the Jammu–Srinagar National Highway with 70 units concentrated between Bijbehara and Awantipora forming a cricket bat manufacturing cluster.

total functional units in the cluster, composed of 10 small scale, 10 medium scale, and 8 large scale, were selected randomly to collect the required data for the present study. The information regarding production and sales, etc., was collected (during 2012 and 2013) with the help of an open-end questionnaire, which was framed strictly in accordance with the objectives of the study. The data collected for all the parameters were averaged for final analysis, using simple statistical and economic tools (Nautiyal 1998, Chatha et al. 1991). The breakeven point was determined as per the procedure followed by Reddy and Ram (2000).

$$\mathrm{BEP} = \frac{F}{P - V}$$

where F is the total annual fixed cost, V is the variable cost per unit, and P is the selling price per unit.

The rate of capital turnover was calculated following the formula of Singh et al. (2010).

$$\text{Rate of capital turnover}\,(r) = \frac{\text{gross income}}{\text{average capital investment}}$$

BCR was calculated by using the formula

$$\text{BCR} = \frac{\text{gross returns}}{\text{total costs}}$$

The export competitiveness was assessed by using the Nominal Protection Coefficient (NPC) procedure followed by Hyma et al. (2003). The product under consideration is highly competitive when NPC < 0.5, moderately competitive when NPC $= 0.5$ to 1, and noncompetitive when NPC > 1.

$$\text{NPC} = \frac{\text{pd}}{\text{pb}}$$

where pd is the domestic wholesale price and pb is the border price or reference price

Results and Discussion

The economic analysis of the cricket bat industry is presented in Tables 1 and 2. The cost estimates for bat manufacturing in the various categories of units, i.e., small, medium, and large, revealed that the total costs involved in establishing and running these industrial units worked out to be Rs 16.204, 24.703, and 36.061 million, respectively, with an average total cost of Rs 25.656 million. On an average, about 96 percent of the total costs were variable costs (operational) and 4 percent were fixed costs. The proportions of fixed costs to total costs were lowest for medium- and large-scale units, thus not only revealing better use of fixed resources but also implying that variable/operational costs comprise a significant part for milling and producing cricket bats. Among the various costs, interest on fixed capital constituted about 60, 62, and 61 percent of the total fixed costs for small-, medium-, and large-scale units, respectively. Among the working cost components, the main items were purchase of wood (for conversion to clefts), labor costs, and cost of imported handles, which together accounted for 86.56, 86.3, and 86.21 percent of the total variable costs incurred by small, medium, and large units, respectively. The cost of manufacturing bats decreased with the increase in size of manufacturing unit. The data further revealed that gross returns earned by small-, medium-, and large-scale units were Rs 2.737, 5.078, and 8.273 million with BCRs of 1.69, 2.05, and 2.29, respectively (average BCR, 2.01), thereby reflecting that the cricket bat manufacturing enterprise was an economically viable livelihood activity and lucrative venture despite underutilization of installed production capacity.

Table 1.—Cost and return structure of cricket bat industrial units in Kashmir.

Particulars	Costs involved (rupees) by industrial unit size			
	Small scale ($n = 10$)	Medium scale ($n = 10$)	Large scale ($n = 8$)	Overall group avg.
A. Variable/operational costs				
1. Labor charges				
a. Skilled	84,000	138,000	214,000	145,333
b. Semiskilled	120,000	198,000	294,000	204,000
c. Helper/watchman	48,000	96,000	1,44,000	96,000
2. Manager	84,000	84,000	84,000	84,000
3. Raw materials				
a. Wood (@ Rs 250/ft^3)	900,000	1,350,000	2,000,000	1,416,667
b. Sand paper	1,000	3,500	5,000	3,167
c. Glue	2,500	5,000	7,000	4,833
d. Handle (@ Rs 8/handle)	120,000	180,000	250,000	183,333
e. Handle cover and stickers	12,000	18,000	25,000	18,667
4. Transport charge	18,000	30,000	50,000	32,667
5. Electricity bill	12,000	15,600	22,000	16,533
6. Diesel	60,000	96,000	140,000	98,667
7. Oil lubricants	6,000	10,000	15,000	10,333
8. Repairs and maintenance	6,000	10,000	20,000	12,000
9. Miscellaneous	10,000	15,000	20,000	15,000
Total	1,483,500	2,249,100	3,290,000	2,340,867
Interest on working capital @ 5%	69,975	108,255	160,300	112,843
Total variable costs	1,553,475	2,357,355	3,450,300	2,453,710
B. Fixed costs				
1. Depreciation on:				
a. Infrastructure	400	560	675	545
b. Trolley and plainer	565	788	900	751
c. Grinder, sander, presser, gen-set, etc.	450	560	675	562
2. Rental value of land	5,500	11,000	16,500	11,000
3. Interest on fixed capital @10%	40,000	70,000	95,000	68,333
4. Insurance/license fee	20,000	30,000	42,000	30,667
Total fixed costs	66,915	112,908	155,750	111,858
Total costs (A + B)	1,620,390	2,470,263	3,606,050	2,565,568

Table 2.—Revenue generated.

Returns	Production potential (rupees annum^{-1}) by industrial unit size			
	Small scale ($n = 10$)	Medium scale ($n = 10$)	Large scale ($n = 8$)	Overall group avg.
A. Revenue from final product				
1. Export quality bats				
a. @ Rs 2,500/bat	500,000	812,500	1,250,000	854,167
b. @ Rs 1,500/bat	750,000	1,200,000	1,800,000	1,250,000
2. Locally sold bats				
a. A class bats (@ Rs 250)	375,000	870,000	2,250,000	1,165,000
b. B class bats (@ Rs 150)	405,000	1,350,000	1,875,000	1,210,000
c. C class bats (@ Rs 75)	487,500	562,500	656,250	568,750
d. Bats for kids (@ Rs 40)	180,000	220,000	354,000	251,333
Total (1 + 2)	2,697,500	5,015,000	8,185,250	5,299,250
B. Revenue from by-products				
1. Fuel wood	35,000	55,000	75,000	55,000
2. Saw dust	5,000	8,000	12,500	85,000
Grand total (A + B)	2,737,500	5,078,000	8,272,750	5,362,750
B:C ratio	1.69	2.05	2.29	2.01

The survey of sampled industrial units also revealed that manufacturing cricket bats in Kashmir is a labor-intensive activity. Owing to insufficient mechanization, the industry is already supporting the livelihood of around 50,000 people who are directly or indirectly benefiting from this trade (Wadoo 2007). With plans on expanding the production of cricket bats in the future, the potential of this industry for employment is expected to increase. The various activities involved will require all classes of manpower, viz., skilled, semiskilled, and unskilled, for value addition and final processing. Thus, this industry has been contributing to the employment generation in Kashmir, a place where the industrial sector could never flourish due to geographical, topographical, political, and other reasons (Anonymous 2008–2009, 2010–2011), thereby leaving very few options for the youth of the valley to make their living.

The breakeven point analysis indicates the level of production at which the entrepreneur neither loses money nor makes a profit. The analysis of this parameter with respect to the production of cricket bats in Kashmir is presented in Table 3. The results reveal that while breakeven quantity of small-, medium-, and large-scale bat manufacturing units was 862.53, 1,101.00, and 1,314.46 bats, respectively, these units manufactured 15,900, 26,605, and 40,800 bats per annum, thus asserting that the bat manufacturing units were operating above the breakeven quantity. These results again affirm that manufacturing cricket bats is a profitable entrepreneurial activity with high capital turnover.

The results (Tables 3 and 4) further reveal that the bat manufacturing industry in Kashmir is highly competitive for both Grade A and Grade B bats (higher quality seasoned bats graded with respect to number of grains per square inch of the wood and free from other defects), which are exported to other countries with an average border price of $100 and $70 and nominal protection coefficient of 0.45 and 0.39, respectively, for these two categories of bats.

Main Constraints for Development and Future Strategies for Sustaining Cricket Bat Industry in Kashmir

The survey of all the selected manufacturing units revealed that the cricket bat industry of Kashmir is facing some constraints (listed below) that hinder its development. The survey also explored some developmental strategies and research needs for exploiting the full economic potential of this sustainable livelihood entrepreneurship option in Kashmir.

Constraints for development of cricket bat industries

1. The best quality cricket bats are made from the wood of a female cultivar of white willow (*Salix alba* var. *caerulea*). The germplasm of the best clones of this cultivar are not available in amounts sufficient to supply enough quality raw materials. Further, the plantations of this cultivar are not raised under intensive management, so there is always a chance of hybridization and loss of identity.
2. The willow growers and bat manufacturers have no knowledge regarding the identification of cricket bat willow (*Salix alba* var. *caerulea*) trees, and as such there is no surety that the raw material used is obtained from the specified cultivar.

Table 3.—Breakeven point analysis (rupees) of cricket bat industry in Kashmir.

Size of industrial unit	Fixed cost	Variable cost	Volume of output	Avg. price per bat	Total revenue	Variable cost/unit	Breakeven quantity
Small scale	66,915	1,469,475	15,900	170	2,697,500	92.42	862.53
Medium scale	112,908	2,273,355	26,605	188	5,015,000	85.45	1,101.00
Large scale	155,750	3,366,300	40,800	201	8,185,250	82.51	1,314.46

Table 4—Export competitiveness of bat industry in Kashmir.

Particulars	Avg. domestic wholesale price, Rs ($)	Avg. border price, Rs ($)	Nominal protection coefficient
Export-quality bats			
Grade A	2,500 (46.25)	5,405 (100)	0.45
Grade B	1,500 (27.76)	3,783 (70)	0.39

3. The plantations of *Salix alba* are grown and managed indiscriminately without following any scientific tree crop timeline. The timber thus obtained has many knots and other defects that reduce the costs of clefts.
4. No incentives, viz., minimum support price, input subsidy, etc., are given to farmers for raising cricket bat willow plantations.
5. The unavailability of highy skilled labor within the state is another negative point. The industries have to hire these workers (bat manufacturers) from other neighboring states, such as Punjab, Uttar Pradesh, and Delhi. Thus the employment potential of this industry is not exploited fully by the locals.
6. Export promotion schemes, demand creation, and rejuvenation of underperforming units need to be managed and monitored by government agencies on a priority basis.

Strategies for obtaining quality raw material

Producing defect-free raw material by planting of poles, locally known as ''mawas,'' is the traditional method of raising cricket bat willow in Kashmir. These poles/mawas (usually 3-m-long cuttings with an approximate diameter of 30 mm at the top end and 55 mm across the base) are planted directly on the plantation sites. In order to ensure 100 percent rooting and survival it is always better to soak the basal portion of mawas in water for 8 to 12 days before planting them at a depth of about 80 cm. After planting, the growers should tend the trees carefully if they are to sell their timber to cricket bat makers. The most important tending operation right from the early stages of growth is the removal of small epicormic shoots on the stem. If allowed to grow, these shoots form pin-sized knots in the wood, which weaken it and hence reduce its value. The trees neglected for just 1 year during their lifetime will have little or no commercial value at maturity. Thus the side shoots should be rubbed off at least up to the height of 84 inches (213.5 cm) from ground level. Maintenance is the most labor-intensive for the first 5 years of growth, after which the bark will harden up and the side shoots become less evident.

Value addition of raw material after harvesting

Cricket bat willow trees are normally purchased standing, with all felling, extraction, and clearing done by the contractor/unit holder. The trees should normally be felled once they attain at least 58 inches (147.5 cm) girth at 48 inches (142.3 cm) height from ground level. The price of trees is more dependent on volume than quality, with each tree being sold only for Rs 2,500 to Rs 4,000 ($46 to $74) in Kashmir. After felling, the trunk is sawn into three or four rounds (700 mm long), which are then split longitudinally into clefts in a process known as riving (Fig. 2, panels 1 through 4). This process is highly skilled, and only experience will determine the best way to split the timber so as to avoid any imperfections and maximize the amount of top quality timber that will eventually make up the finished bats. Thus, in order to obtain the optimum number of clefts, experienced workers should be engaged to deal with the reaming portion of the harvested trees. Traditionally willows are not graded according to international standards in Kashmir, and that is why the clefts and bats do not attract the global market (Bhat 2004). Thus, in order to add value to cricket bats, the clefts should be graded both before and after their conversion into finished material. The clefts should be graded by a number of points, but most importantly the quality relates to the straightness of the grain, the width of the grain, varying degree of brown wood and/or butterfly stain, plus the number of blemishes or knots on the bat (Leclercq 1997). Generally, more color in cricket bats lowers its grade in international markets. The finished clefts/blades are then graded per number of grains as follows:

1. Grade ''A'' is the best looking blade with some red wood evident on the edge of the bat. The grain on the face is straight, and there should be at least four grains visible. There should not be a single knot or speck in the playing or nonplaying area of the bat.
2. Grade ''B'' is also a very good quality blade, and normally a larger amount of red wood can be seen on the edge of a bat, which has no effect on the playing ability of the bat and is purely cosmetic. Again there should be at least four straight grains on the face of the bat. Minor blemishes and some pin knots or specks may be visible.
3. The Grade ''C'' blade also offers a good value for the money. It has up to half color across the bat and is sometimes bleached, which has no direct relation to the playing ability of the wood. There will be a minimum of three to four grains on the face of the bat, which may not always be perfectly straight. Again some very minor knots or a little butterfly stain may be present with perhaps more prominent speck.
4. A Grade ''D'' blade is normally over half color or contains butterfly stain. This wood is also bleached to make it look better. Any number of grains is possible, and the blade contains a butterfly stain with more prominent specks or knots.

Manufacturing best quality cricket bats

After grading and seasoning, the cricket bat makers carefully select each cleft to exploit the natural spring in willow. The near-finished size blades should be pressure treated carefully to retain some of the natural air pockets in the timber to create lively and responsive bats. For this purpose, the bat is passed underneath the roller of the cricket bat press and the face and edges are compressed to ensure resilience and provide a hardened surface capable of withstanding the impact of a cricket ball. To achieve this, the blade should be pressed four times by applying up to 2,000 pounds of pressure per square inch (Fig. 2, panel 5). After pressing, a processed cane handle (boiled in oil and dried in the sun), cut to the right length with faces being planed to ensure a good gluing surface, is attached to the bat.

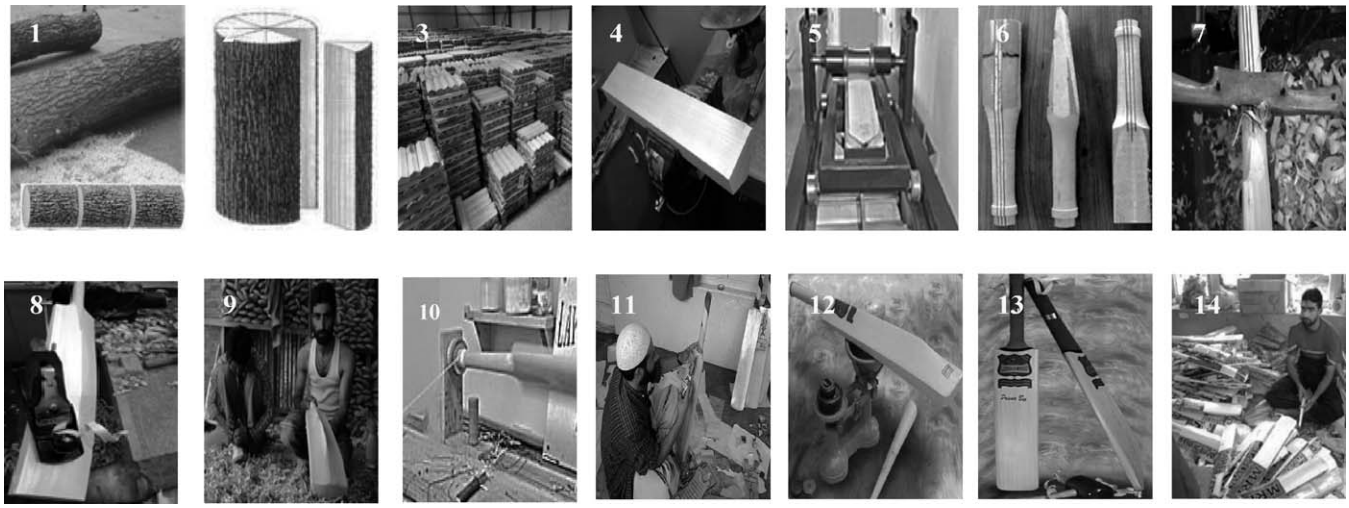

Figure 2.—Steps (1 through 14) involved in processing, manufacturing, and marketing of cricket bats in Kashmir.

Finally the top part of the handle is shaped to the bat maker's specification. The most popular pattern has nine pieces of cane with three rubber inserts. Once the splice (V) has been cut, the handle can be fitted into the blade using a mallet to make sure the handle has reached the base of the joint (Fig. 2, panels 6 through 11). The bat needs to be expertly shaped, and for this, a maximum amount of wood should be left in the driving area while working the blade. Similarly, the toe should be carefully shaped to a distinctive angle for strength and protection. The final smoothing process should be done to achieve maximum weight distribution throughout the back of the bat. The best quality A-grade cricket bat weighs about 2 pounds 7 ounces (Fig. 2, panels 12 through 14).

Future research needs

The overexploitation of cricket bat willow (*Salix alba* var. *caerulea*) has resulted in almost complete extermination of plantation grooves of this cultivar from Kashmir, where it is presently found growing sparsely as individual trees rather than as intensively managed plantations. To sustain this industry, the following research activities need to be initiated on a priority basis so as to make inexorable availability of quality raw material a reality.

1. Undertake extensive survey of willow plantations throughout the valley of Kashmir and Ladakh so as to collect more germplasm from phenotypically superior trees. In this direction, the Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir has already collected elite germplasm of variety *caerulea* from some willow growing belts of the valley. An elaborate willow breeding program needs to be initiated to produce a sufficient number of new and better crosses to serve as rich pools of pedigreed hybrids for selection and clonal multiplication.
2. An elaborative willow breeding program needs to be initiated to produce a sufficient number of new and better crosses to serve as rich pools of pedigreed hybrids for selection and clonal multiplication.
3. The light color preferred for the best bats can only be obtained from sapwood, the width of which presupposes a reasonably well grown tree. To obtain this, the tree crop time line should be developed for this cultivar so as to obtain quality raw material.
4. The mechanical properties and other wood characteristics of the locally available cricket bat willow need to be determined and documented to compare it with that of the English bat willow.
5. The industry can exploit the international markets only if modern techniques are followed for crafting braded cricket. The efficient marketing strategies thus need to be developed and implemented.

Conclusions

In order to make the cricket bat industry economically sustainable, a holistic approach needs to be adapted by the government of this state. In addition to a comprehensive package of general investment incentives, the promoters of this enterprise should be given special capital investment subsidy so that bigger units with state-of-the-art machinery and scientific seasoning facilities for willow clefts could easily be set up. Provisions should be made to give cost-reduction incentives to the manufacturers so that they could have an advantageous initial leverage to face the competition of established brands from India and abroad. Most importantly, emphasis should be placed on growing large-scale scientifically managed plantations of *Salix alba* var. *caerulea,* which is most suitable for crafting cricket bats to international standards. For every tree that is felled, growers should be encouraged to replant at least five willow trees to ensure a sustained supply of quality raw material to the manufacturers on a long-term basis. Maintenance of trees on a scientific tree crop time line is of paramount importance, because trees neglected for only 1 year (during their lifetime) will have little or no commercial value at maturity. The trees should thus be debudded up to the kink height so as to get the knot-free timber for crafting cricket bats.

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