

## Appendix

### 1. Different Fielding Parameters ( $Y_{ij}$ ) Developed By Saikia, Bhattacharjee & Lemmer [1] Close Fielding Within 30 Yards Circle

#### 1.1. Type of Player: Fielder

##### 1.1.1. Catch

- A. Regulation catches [Yes (1), Yes with fumble (0.8), No (0)]
- B. High lofted catch
  - i. Running backwards [Yes (1), Yes with fumble (0.8), Reached (0.5), No (0)]
  - ii. With slight adjustment of position [Yes (1), Yes with fumble (0.8), No (0)]
  - iii. With considerable running [Yes (1), Yes with fumble (0.8), Reached (0.5), No (0)]
  - iv. Sunlight/lights disturbing the vision [Yes (1), No (0)]
- C. Hanging on to a hardly hit stroke [Yes (1), Missed but stopped (0.5), No (0)]
- D. Catching with an upward leap [Yes (1), Reached & stopped (0.5), Reached (0.2), No (0)]
- E. Catch with dive
  - i. Towards natural side [Yes (1), Reached & stopped (0.5), Reached (0.2), No (0)]
  - ii. Towards wrong side [Yes (1), Reached & stopped (0.5), Reached (0.2), No (0)]
  - iii. Forward [Yes (1), Reached & stopped (0.5), Reached (0.2), No (0)]

##### 1.1.2. Fielding

- A. Regulation fielding with little adjustment of positions and return the ball
- B. [Yes and return to proper end (1), Yes with fumble and return to proper end (0.8), Yes and return to wrong end (0.5), Yes with fumble and return to wrong end (0.2), No (0)]
  - i. Fielding with dives
  - ii. Towards natural side [Yes (1), Reached, leading to restriction of runs (0.5), No (0)]
  - iii. Towards wrong side [Yes (1), Reached, leading to restriction of runs (0.5), No (0)]
  - iv. Forward/Backward [Yes (1), Reached, leading to restriction of runs (0.5), No (0)]
- C. Considerable running to field and return the ball (left/right/forward) [Yes (1), Yes with fumble (0.5), No (0)]
- D. Considerable running behind the ball towards the boundary [Stopped and returned instantly (1), Stopped the ball, paused and returned (0.8), Stopped the ball but returned by other fielder (0.5), Unable to stop the ball (0)]

##### 1.1.3. Run out

#### A. Direct throw towards the stumps

[Hitting the stumps causing a dismissal (1), Hitting the stumps causing a not out declared by third umpire (0.8), Hitting the stumps after the batsman has reached (0.5), Missed the stumps by a whisker (0.2), Otherwise (0)]

## **B. Indirect throw to wicket keeper/fielder near the stumps**

[Straight to the hands of wicket keeper/fielder near the stumps causing a dismissal (1), To the hands of wicket keeper/fielder but away from the stumps leading to dismissal (0.8), Away from the hands of wicket keeper/fielder but near the stumps but no dismissal, as there was no follow up (0.5), Away from the reach of wicket keeper/fielder and away from the stumps (0)]

## **C. Directly taking the ball into the stumps**

[Yes (1), No (0)]

### **1.2. Type of Player: Bowler (as a fielder)**

#### **1.2.1. Catch**

**A.** Direct Catch from defensive stroke [Yes (1), Caught with fumble (0.8), No (0)]

**B.** Take on to a hard hit stroke [Yes (1), Missed but stopped (0.5), No (0)]

i. With slight adjustment [Yes (1), Yes with fumble (0.8), No (0)]

ii. With dive towards direction of movement after delivery [Yes (1), Yes with fumble (0.8), No (0)]

iii. With dive towards opposite direction of movement after delivery [Yes (1), Yes with fumble (0.8), No (0)]

iv. With an upward leap [Yes (1), No but stopped (0.5), No (0)]

**C.** Lofty ball caught with forward dive [Yes (1), No (0)]

**D.** Lofty ball caught running backward [Yes (1), No (0)]

#### **1.2.2. Fielding**

**A.** Regulation with slight adjustment of position [Yes (1), Yes with fumble (0.5), No (0)]

**B.** Fielding with dives

i. Towards natural side [Yes (1), Reached, leading to restriction of runs (0.5), No (0)]

ii. Towards wrong side [Yes (1), Reached, leading to restriction of runs (0.5), No (0)]

**C.** Considerable running to field and return the ball [Yes (1), Yes with fumble (0.5), No (0)]

**D.** Collection of throws from fielders

i. Throws that should be collected without much effort [Collected cleanly (1), Collected with fumble (0.5), Missed completely (0)]

ii. Throws away from the bowler but collectable [Collected diving (1), Dived, Reached but could not collect (0.5), Missed without much effort (0)]

#### **1.2.3. Run Out**

**A.** Direct throw towards the stumps [Hitting the stumps causing a dismissal (1), Hitting the stumps causing a not out declared by third umpire (0.8), Hitting the stumps after the batsman has reached (0.5), Missed the stumps by a whisker (0.2), Otherwise (0)]

**B.** Indirect throw to wicket keeper/fielder near the stumps [Causing a dismissal (1), Causing a not out declared by third umpire (0.5), After the batsman has reached (0)]

- C. Type of indirect throw to wicket keeper/fielder [Straight to the hands over the stumps (1), Straight to the hands away from the stumps (0.8), Away from the hands of wicket keeper/fielder but over the stumps (0.5), Away from the hands and away from the stumps (0)]
- D. With throws from fielders [Causing a dismissal (1), Causing a not out declared by third umpire (0.8), Collected cleanly but could not break the stumps (0.5), Could not collect-missing a run out (0)]

### **1.3. Type of Player: Wicket Keeper**

#### **1.3.1. Gathering the Ball**

- A. Regulation collection [Yes (1), Yes with fumble (0.5), No (0)]
- B. Collection with Dive (*against spinner*)
  - i. Towards the offside of the batsman [Collected cleanly (1), Reached, leading to restriction of bye-runs (0.5), No (0)]
  - ii. Towards the legside of the batsman [Collected cleanly (1), Reached, leading to restriction of bye-runs (0.5), No (0)]
- C. Collection with Dive (*against fast bowler*)
  - i. Towards the offside of the batsman [Collected cleanly (1), Reached, leading to restriction of bye-runs (0.5), No (0)]
  - ii. Towards the legside of the batsman [Collected cleanly (1), Reached, leading to restriction of bye-runs (0.5), No (0)]
- D. Considerable running to collect the ball (to save leg-bye) [Yes (1), Yes with fumble (0.5), No (0)]
- E. Collection of throws from fielders
  - i. Throws that should be collected without much effort [Collected cleanly (1), Collected with fumble (0.5), Missed completely (0)]
  - ii. Throws away from the wicket keeper but collectable [Collected diving (1), Collected with an upward leap (0.8), Dived, Reached but could not collect (0.5), Missed without much effort (0)]

#### **1.3.2. Catching**

- A. Direct regulation catch (Spinner) [Yes (1), Caught with fumble (0.8), No (0)]
- B. Take a diving catch (Spinner)
  - i. With dive towards the off-side (Spinner) [Yes (1), Yes with fumble (0.8), No (0)]
  - ii. With dive towards the legside (Spinner) [Yes (1), Yes with fumble (0.8), No (0)]
  - iii. With an upward leap (Spinner) [Yes (1), No but stopped (0.8), No (0)]
- C. With forward dive (Spinner) [Yes (1), No (0)]
- D. With running backward [Yes (1), Reached but missed (0.8), No (0)]
- E. Direct regulation catch (Fast) [Yes (1), Caught with fumble (0.8), No (0)]
- F. Take a diving catch (Fast)
  - i. With dive towards the off-side (Fast) [Yes (1), Yes with fumble (0.8), No (0)]
  - ii. With dive towards the legside (Fast) [Yes (1), Yes with fumble (0.8), No (0)]
  - iii. With an upward leap (Fast) [Yes (1), No but stopped (0.5), No (0)]

- G. With forward dive (Fast) [Yes (1), No (0)]
- H. With running backward [Yes (1), Reached but missed (0.5), No (0)]

### **1.3.3. Stumping**

- A. Batsman left the crease and did not attempt to return [Stumped (1), Stumped with fumble (0.8), No (0)]
- B. Batsman stepped forward & tried to return [Stumped (1), Stumped but not out declared by third umpire (0.8), Stumped but after the batsman has reached; no referral to third umpire (0.5), Fumbled and missed (0)]

### **1.3.4. Run Out**

- A. Direct throw towards the stumps [Hitting the stumps causing a dismissal (1), Hitting the stumps causing a not out declared by third umpire (0.8), Hitting the stumps after the batsman has reached (0.5), Missed the stumps by a whisker (0.2), Otherwise (0)]
- B. From throws from fielders [Causing a dismissal (1), Causing a not out declared by third umpire (0.8), Collected cleanly but could not break the stumps (0.5), Could not collect-missing a run out (0)]

## **2. Distant Fielding Outside 30 Yards Circle**

### **2.1. Type of Player: Fielder**

#### **2.1.1. Catch**

- A. Regulation catches with adjustment in position [Yes (1), Yes with fumble (0.8), No but saved some runs (0.5), No (0)]
- B. Catches with considerable running [Yes (1), Yes with fumble (0.8), No but saved some runs (0.5), No (0)]
- C. Catches with running and diving [Yes (1), Yes with fumble (0.8), No but saved some runs (0.5), No (0)]
- D. Catches over the fielders head [Yes (1), Yes with fumble (0.8), No but saved some runs (0.5), No (0)]
- E. Sunlight/lights disturbing the vision [Yes (1), No (0)]

#### **2.1.2. Fielding**

- A. Regulation fielding with slight adjustment of positions and return the ball [Yes and return to proper end (1), Yes with fumble and return to proper end (0.8), Yes and return to wrong end (0.5), Yes with fumble and return to wrong end (0.2), No (0)]
- B. Considerable running to field and return the ball [Yes (1), Yes with fumble (0.5), Misfield, leading to a run (0)]

#### **2.1.3. Run out**

- A. Direct throw towards the stumps [Hitting the stumps causing a dismissal (1), Hitting the stumps causing a not out declared by third umpire (0.8), Hitting the stumps after the batsman has reached (0.5), Missed the stumps by a whisker (0.2), Otherwise (0)]
- B. Indirect throw to wicket keeper/fielder near the stumps [Causing a dismissal (1), Causing a not out but was declared by third umpire (0.5), The wicket keeper/fielder was able to break the stumps but after the

batsman has reached (0.2), The throw was away from the reach of wicket keeper/fielder standing near the stumps (0)]

**Appendix B** Wicket weights according to batting position of batsman (bi) as in Lemmer.<sup>9</sup>

<b>Batting position</b>	<b>Wicket weight bi</b>
1	1.3
2	1.35
3	1.4
4	1.45
5	1.38
6	1.18
7	0.98
8	0.79
9	0.59
10	0.39
11	0.19

**Appendix-C** Weights of the different fielding parameters (kij) as discussed in Appendix a developed by Saikia, Bhattacharjee & Lemmer.<sup>1</sup>

<b>Catch: close fielding within 30 yards circle</b>			<b>Relative weights</b>
<b>Alternatives</b>	<b>Weights</b>	<b>Express all d's in terms of 'a' (2d=a and a=1)</b>	
I	d	$a/2$	0.5
II(A)	1.2d	$1.2 \times (a/2)$	0.6
II(B)	1.1d	$1.1 \times (a/2)$	0.55
II(C)	2d	A	1
II (D)	1.2d	$1.2 \times (a/2)$	0.6
III	1.5d	$1.5 \times (a/2)$	0.75
IV	1.2d	$1.2 \times (a/2)$	0.6
V(A)	1.2d	$1.2 \times (a/2)$	0.6
V(B)	1.3d	$1.3 \times (a/2)$	0.65
V(C)	1.3d	$1.3 \times (a/2)$	0.65
<b>Run-Out: close fielding within 30 yards circle</b>			
I	2d	a	1
II	1.2d	$1.2 \times (a/2)$	0.6
III	1.5d	$1.5 \times (a/2)$	0.75
<b>Fielding: close fielding within 30 yards circle</b>			
I	d	$0.8a/2$	0.4
II(A)	1.7d	$1.7 \times (0.8a/2)$	0.68
II(B)	2d	0.8a	0.8
II(C)	1.8d	$1.8 \times (0.8a/2)$	0.72
III	1.2d	$1.2 \times (0.8a/2)$	0.48
IV	1.5d	$1.5 \times (0.8a/2)$	0.6

**Catch: distant fielding outside 30 yards circle**

I	1.1d	$1.1 \times (a/2)$	0.55
II	1.3d	$1.3 \times (a/2)$	0.65
III	2d	a	1
IV	1.5d	$1.5 \times (a/2)$	0.75
V	d	$a/2$	0.5

**Run-Out: distant fielding outside 30 yards circle**

I	2d	a	1
II	1.5d	$1.5 \times (a/2)$	0.75

**Fielding: distant fielding outside 30 yards circle**

I	1.5d	$1.5 \times (0.8a/2)$	0.6
II	2d	0.8a	0.8

**Catch: bowler as a fielder**

I	1.1d	$1.1 \times (a/2)$	0.55
II(A)	1.5d	$1.5 \times (a/2)$	0.75
II(B)	1.8d	$1.8 \times (a/2)$	0.9
II(C)	2d	a	1
II(D)	1.3d	$1.3 \times (a/2)$	0.65
III	1.2d	$1.2 \times (a/2)$	0.6
IV	1.3d	$1.3 \times (a/2)$	0.65

**Run-Out: bowler as a fielder**

I	2d	a	1
II	1.5d	$1.5 \times (a/2)$	0.75
III	d	$a/2$	0.5
IV	1.2d	$1.2 \times (a/2)$	0.6

**Fielding: bowler as a fielder**

I	d	$0.8a/2$	0.4
II(A)	1.8d	$1.8 \times (0.8a/2)$	0.72
II(B)	2d	0.8a	0.8
III	1.5d	$1.5 \times (0.8a/2)$	0.6
IV(A)	1.1d	$1.1 \times (0.8a/2)$	0.44
IV(B)	1.3d	$1.3 \times (0.8a/2)$	0.52

**Gathering the Ball: wicket keeper as a fielder**

I	d	$0.8a/2$	0.4
II(A)	1.8d	$1.8 \times (0.8a/2)$	0.72
II(B)	2d	0.8a	0.8
III(A)	1.5d	$1.5 \times (0.8a/2)$	0.6
III(B)	1.7d	$1.7 \times (0.8a/2)$	0.68
IV	1.3d	$1.3 \times (0.8a/2)$	0.52
V(A)	1.1d	$1.1 \times (0.8a/2)$	0.44
V(B)	1.2d	$1.2 \times (0.8a/2)$	0.48

**Stumping: wicket keeper as a fielder**

I	1.5d	$1.5 \times (a/2)$	0.75
II	2d	a	1

**Run-Out: wicket keeper as a fielder**

I	2d	a	1
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II	1.5d	$1.5 \times (a/2)$	0.75
<b>Catch: wicket keeper as a fielder</b>			
I	1.1d	$1.1 \times (a/2)$	0.55
II(A)	1.8d	$1.8 \times (a/2)$	0.9
II(B)	2d	a	1
II(C)	1.5d	$1.5 \times (a/2)$	0.75
III	1.5d	$1.5 \times (a/2)$	0.75
IV	1.3d	$1.3 (a/2)$	0.65
V	d	a/2	0.5
VI(A)	1.3d	$1.3 \times (a/2)$	0.65
VI(B)	1.5d	$1.5 \times (a/2)$	0.75
VI(C)	1.3d	$1.3 \times (a/2)$	0.65
VII	1.1d	$1.1 \times (a/2)$	0.55
VIII	1.2d	$1.2 \times (a/2)$	0.6

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