

3 **Jharkhand and Organic Agriculture**

4 **Abstract**

5 *Organic farming is not of recent origin in India. In ancient literature such as RighVeda the*
6 *use of animal dung as manure was emphasized. Approximately two-thirds of a million of the*
7 *farmer populations in India are cultivating organically, but this a tiny portion of the farming*
8 *community. As there are few states that have not done much development in organic farming*
9 *like Jharkhand which became independent as a separate state 16 years ago. Approximately*
10 *0.08% of Jharkhand's cultivatable land is being promoted to be free from chemical fertilizers*
11 *and pesticides. Out of the net cultivated area of 31 lakh hectare (ha) only 26,310 ha is the*
12 *area where organic cultivation is promoted. When we compare it with the states like Sikkim*
13 *and Meghalaya, which have been or will be certified organic state by 2020, we get the real*
14 *picture of farmers lagging behind. Lack of certification, lengthy procedure and low*
15 *production initially are some of the reasons because of which farmers don't opt for organic*
16 *agriculture. Initiatives like Public Private Partnership, promoting animal husbandry,*
17 *Contract Organic farming (COF), Participatory Guarantee System (PGS), Farmer Producer*
18 *Organisation (FPO) and raising public awareness are some steps that are required to*
19 *develop organic agriculture, to improve human health and to save the environment.*

20 **Keywords:** Organic agriculture, Participatory Guarantee System (PGS), Certified, Contract
21 Organic Farming, Environment.

22 **1. Introduction**

23 Organic agriculture basically is a system of production which discourages the use of synthetic
24 fertilizers and growth regulators to the maximum and relies on basic measures like crop
25 rotation, crop residue, animal and green manures, off-farming organic waste and many more
26 to maintain soil productivity (physical aspects of soil), nutrient supply to plants, weeds and
27 insect control. "It is a method of farming system which primarily aims at cultivating the land
28 and raising crops in such a way, as to keep the soil alive and in good health by use of organic
29 wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along

30 with beneficial microbes (bio-fertilizers) to release nutrients to crops for increased
31 sustainable production in an eco-friendly pollution free environment” (Yadav, 2012, p. 3).
32 Organic farming is not of recent origin in India. In ancient literature such as RighVeda the
33 use of animal dung as manure was emphasized. “The principles apply to agriculture in the
34 broadest sense, including the way people tend soils, water, plants and animals in order to
35 produce, prepare and distribute food and other goods” (Yadav, 2012, p. 12) According to
36 IFOAM organic agriculture means “any system that uses organic methods and is based on the
37 Principles of Organic Agriculture”, regardless of whether it’s certified or not (IFOAM, 2015,
38 p. 2). In India there is a section of farmers who are farming organically, not because they
39 opted to save the environment, but because they are using this method traditionally and such
40 farmers are not stable financially and have no certification, yet they are producing it
41 organically.

42 This article gives an overview of organic farming in India with focus on Jharkhand. It
43 provides us the information about the status and development of organic farming in
44 Jharkhand. The paper also highlights the problems and constraints that farmers of Jharkhand
45 face as they adopt or think of adopting organic farming and solutions to the problem faced by
46 farmers.

47 **2. Organic India and Jharkhand**

48 Organic agriculture is being adopted by farmers all over the country for different reasons
49 giving its growth a three dimensional picture. Categorically, there are three types of farmers.
50 First includes those organic farmers, which come from no/low input zones, where organic
51 farming is a tradition owing to the absence of the resources needed for conventional high
52 input intensive agriculture. The majority of farmers in this category are uncertified. Second
53 category of farmers includes those who have adopted organic farming in recent times due to
54 adverse effects of conventional farming like depletion in soil health, food being contaminated
55 with different chemicals and poor level of production. It includes both certified and
56 uncertified farmers. In the third category, majority of the farmers are the certified ones. They
57 are the farmers and firms who are producing the organic crops for commercial purpose in a
58 planned manner. Their sole motive is to earn profit by producing organically (Yadav, 2012, p.
59 7). Approximately two-thirds of a million of the farmer population in India is cultivating
60 organically (Hill, 2016). In 2015 India showed an increase in the export and domestic market
61 of organic produce with a growth of 30 and 40 percent respectively (Wai, 2016, p. 176). A

62 year back with the production of more than 70,000 MT of organic cotton lint, India has
 63 become the largest producer by having more than 50% of the production share in the world's
 64 organic cotton (Yadav, 2012, p.11). "With the phenomenal growth in area under organic
 65 management and growing demand for wild harvest products India has emerged as the single
 66 largest country with highest arable cultivated land under organic management" (Yadav, 2012,
 67 p. 10). The export performance of organic food products from India is highest with cash
 68 crops like tea, coffee, spices etc and then cereal crops like paddy, wheat.

69 **Table 1.1 Export performance of organic food products from India.**

70

S.No	Organic Food	Sales (Tons)
1	TEA	3000
2	COFFEE	550
3	SPICES	700
4	RICE	2500
5	WHEAT	1150
6	PULSES	300
7	OILSEEDS	100
8	FRUITS & VEGETABLES	1800
9	CASHEWNUT	375
10	COTTON	1200
11	HERBAL PRODUCTS	250

71 Source: Chandrashekar, 2010, p.6

72 In India, there are few states that are rapidly moving towards organic farming like Sikkim
 73 which is in the direction of being 100 percent organic, then Meghalaya, which has an aim to
 74 certify 200,000 hectares of land by 2020, starting with just 40,000 hectares in 2015 (Wai,
 75 2016, p. 178). And there are states like Jharkhand which have not done much development in
 76 organic farming and they need to do much in the field, starting from spreading awareness
 77 among the people through to capacity-building, training and implementation.

78 The Government of Jharkhand formed a society known as Organic Farming Authority of
 79 Jharkhand (OFAJ) in 2012 for promoting organic agriculture, 12 years after getting
 80 independence as a separate state, which shows very little information available about organic
 81 farming in the state. In Jharkhand, more than 70% of the population depends on agriculture

82 as their source of livelihood. The main crop grown here is paddy during kharif season.
83 Several horticultural crops like French beans, Cole crops, and tomato are grown throughout
84 the year. OFAJ was formed to terminate the indiscriminate use of chemical fertilizers. Under
85 its governance 13 districts under Tribal Sub Plan (TSB) namely Ranchi, Khunti, Lohardaga,
86 Gumla, West Singhbhum, East Singhbhum, Saraikela-Kharshawan, Dumka, Simdega, Pakur
87 and Sahebganj have been included (OFAJ, 2013).

88

89 Under OFAJ three separate missions focusing on horticultural crops:

90 **I. State Organic Mission:**

91 In this the total farmland area is 15,700 hectares and fund allocated is Rs 10 crore for all the
92 13 districts. Identified crops are mainly vegetables like Pea, Okra, French bean, and Broccoli.

93 **II. State Spices Mission:**

94 In this the total farmland area is 7610 hectares and fund allocated is Rs 5 crore for all the 13
95 districts. Identified crops are mainly vegetables like turmeric, coriander, garlic, and chilly.

96 **III. State Medicinal Mission:**

97 In this the total farmland area is 3000 hectares and fund allocated is Rs 2 crore for all the 13
98 districts. Identified crops are mainly vegetables like Kalmegh, Aloe Vera, and Shatawar.

99

100 In the present scenario where hundreds of crore of rupees are spent by different states to
101 convert their land to organic, Government of Jharkhand allots a mere Rs 17 crore for
102 promoting organic agriculture in 26,310 hectares of land. This is barely 0.08% of the total
103 agricultural land of the state. Then the amount allocated in the state organic mission on an
104 average is Rs 6,500 to spend per hectare for promoting organic farming, which isn't much
105 apparently. We are taking too much from the environment and giving back too little to
106 maintain the ecology.

107

108 **3. COST ANALYSIS OF ORGANIC FARMING**

109 The cost incurred and income earned between the conventional and organic farming based
110 upon cropping of turmeric and cotton is analysed. 'The total cost of cultivation of organic
111 and conventional turmeric per hectare was worked out to US\$ 2641.43 and US\$ 3529.13
112 respectively. The net income per hectare was US\$ 2727.19 and US\$ 1876.13 respectively.
113 The cost of cultivation of organic and conventional cotton per hectare was worked out to US\$
114 1306.79 and US\$ 1725.19 respectively. The net income per hectare was US\$ 1332.13 and
115 US\$ 1032.68 respectively' (Amarnath & Sridhar, 2012). This definitely shows the real

116 potential of organic farming as it not only helps in monetary terms but also helps in regaining
117 the soil health and environment

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119

120 **4. Problems and constraints available in Jharkhand:**

121 “The most important constraint felt in the progress of organic farming is the inability of the
122 government policy making level to take a firm decision to promote organic agriculture.
123 Unless such a clear and unambiguous direction is available in terms of both financial and
124 technical supports, from the Centre to the Panchayath levels, mere regulation making will
125 amount to nothing” (Narayan. 2005, p. 67). “This immense commercialization of agriculture
126 has also had a very negative effect on the environment. The use of pesticides has led to
127 enormous levels of chemical buildup in our environment, in soil, water, air, in animals and
128 even in our own bodies. Fertilizers have a short-term effect on productivity, but a longer-term
129 negative effect on the environment where they remain for years after leaching and running
130 off, contaminating ground water and water bodies”(Chandrashekar, 2010). Secondly the only
131 agriculture university Birsa Agriculture University needs to take few steps against the
132 scientists who promote chemical farming and seed owned by MNCs. “The availability of
133 quality seeds can also be increased by Public-Private Partnership (PPP) in the seed industry,
134 which can exploit the strengths that exist in these two sectors. While the public system has
135 competent scientific manpower and is equipped for both basic strategic and applied research,
136 the private sector relatively lags behind the vast modern infrastructure facilities and large
137 manpower. However, the private sector has expertise in high tech research like the
138 development of genetically modified varieties and seed production. The climatic conditions
139 of Jharkhand state are ideally suited for quality seed production during winter crops and
140 could be an ideal state for the private sector to exploit the opportunities” (Singh and Singh,
141 2016, p. 13).

142 These are the major problem found by the farmers for the growth of organic farming

143 **4.1 Lack of Awareness:**

144 The lack of awareness can be seen in both, the producers as well as the consumers. The
145 consumer doesn't have much knowledge about organic farming as they don't have any
146 information about the harm which the chemical and pesticides is causing to their health.
147 Secondly, the price of the organic products is higher than other products hereby the
148 consumers, especially the middle class and lower class earning families opt for the produce

149 from chemical farming. Similar is the situation of the farmers as they are unaware about the
150 methods and techniques of organic farming, how to make manures, compost or bio
151 fertilizers, the moisture level required to be maintained etc. Hereby no benefit is available for
152 the soil or for the crops (Narayan. 2005, p. 67).

153 **4.2 Marketing Obstacles in Selling the Products:**

154 Few farmers who took the duress of cultivating organically don't get the right price for the
155 product produced. They don't get the price which they should, more than the products
156 cultivated conventionally. One reason is that people are unaware of certain ill-effects which
157 are caused by the consumption of conventional farming method and hereby don't purchase
158 the organic product in the name of extra expense. (Narayan 2005, p 67). "And the focus is
159 now more on quantity and "outer" quality (appearance) rather than intrinsic or nutritional
160 quality, also called vitality"(Chandrashekar, 2010)

161 **4.3 Inadequate animal husbandry**

162 Animal husbandry of Jharkhand is inadequate, which can be considered as the major
163 drawback, because of which people are unable to produce enough organic manure required
164 for maintaining an organic farm. Another problem is that the farmers do not know how to
165 manage manure, cattle waste etc. which are an important component. Therefore, they need to
166 rely on the market for the supply of organic inputs and this increases the price of the product.

167 **4.4 Desi vs HYV Seeds**

168 Desi seeds are the one which is kept or preserved by the farmers for sowing next year. It is kept in a
169 place generally a dark shaded house free from insects and pest. Optimum temperature is maintained
170 to keep the seeds alive. While high yielding varieties are the one which are made with F1 progeny. In
171 1966 Prof. M.S. Swaminathan introduced the HYV seeds to the farmer under the umbrella of green
172 revolution, but these HYV requires heavy investment. And with the recent inclination of the farmers
173 towards the HYV seeds have degraded the soil as well as the taste and nutritional value of the
174 product is not available. As according to FAO a farmer can use HYV seeds to grow organically but
175 as per the guidelines of National Center for Organic Farming (NCOF) the farmer needs to use
176 traditional seeds for complete certification as an organic farmer. As according to the farmers of
177 Chitarkota, Ratu Block Ranchi, Jharkhand although they sow HYV seeds but they are not at all
178 satisfied morally, as the produce is doesn't have the nutritive value as well as the taste which the desi
179 seed possesses. But still they opt for HYV seeds just for the sake of high production. The residue,
180 i.e. the straw available in the field after the harvest of the crop is not given to the cattles because of

181 the high amount of chemical in the crop so they go for burning the straw. Similar to 80% of the
182 farmers opt for hybrid for paddy cultivation in Eastern India and when ask for the reason to several
183 vendors at Ormanjhi block, Ranchi the prominent reason were increased yield, small agriculture land
184 holding and as they can afford it. (Hill & Hill, 2015)

185 **4.5 Lack of input markets**

186 The majority of the farmers in Jharkhand are small and marginal ones. They don't have the
187 capacity to purchase the inputs required for organic farming because of three reasons:

188 4.5.1 No availability of inputs – several times it is the case that the farmer is there willing
189 to shift its cultivation from inorganic to organic, but unable to do so because of the
190 unavailability of the inputs. Secondly timely availability of the input is also an
191 important concern which is playing an important role in dipping the back to
192 chemical farming.

193 4.5.2 Higher Price of the Inputs – In Jharkhand majority of the farmers are marginalized
194 one, they are unable to match the required quantity of the input required as the price
195 of the input is high. The price of vermicompost is 100 rs per Kilogram and the
196 farmers needs a heavy dosage of vermicompost possibly for organic farming, which
197 acts as a drawback for the farming who are eager to adopt organic agriculture.

198 4.5.3 Duplication – this is also a prominent problem arising in the agricultural marketing
199 sectors, as the farmers do purchase and use the organic input but their produce are
200 adulterated. The reason being the input used by the farmers not being a certified or
201 original one.

202 **4.6 High input costs:**

203 In Jharkhand nowadays, the farmers rely less on livestock for the manure purpose. This
204 is partly because due to the rate of migration and nucleation of families, there is less
205 labour available at home, and so households are reluctant or unable to keep livestock
206 which require grazing and other care. Besides, chemical inputs have been promoted
207 alongside the hybrid seeds which are sold by traders and vendors. Therefore, farmer need
208 to purchase the inputs required for organic farming like vermicompost, manures etc
209 which is costlier than the inputs required in conventional method of farming. This is a
210 major reason, because of which the farmers are not willing to convert their land into
211 organic.

212 **4.7 Lack of financial support:**

213 The farmers of the country do make Self Help Groups and others to help themselves, but the
 214 truth is that the financial input required by the farmers for the conversion of the field into
 215 organic is very high and farmers who are economically weak are unable to opt it.

216 **4.8 Due of nuclear family:**

217 The new wave is there in the village of diving the family into nuclear families, hereby dividing the
 218 land holding capacity of the individuals. This leads to the less land available with the particular
 219 farmers hereby making it unviable for the farmers to cultivate organically

220 **4.9 Disproportionate Agriculture land holding:**

221 The agricultural holding of Jharkhand does show us one of the reasons why the farmers do
 222 opt to convert their field to organic. In all the social groups in Jharkhand, the small and
 223 marginal group make 84.06% of the total agricultural holding, which indirectly also shows the
 224 economic condition of the farmers. Secondly, for the conversion farmer needs to have a
 225 buffer zone, against the chemical farming area to restrict contamination which is approx. 10%
 226 of the total area. A farmer having averaged 1 ha of land can never leave 0.1 ha of its
 227 cultivating area. Therefore, they continue with the conventional farming. Finally, we can say
 228 that In Jharkhand land holding scenario can be divided into two situations. One in which the
 229 farmers have sufficient land holding where he/she can produce organically if all the other
 230 criteria gets fulfilled and second is the one who don't have sufficient land holding and are
 231 unable to sustain their life from that piece of land.

232 **Table 1.2. Number and Area of Agricultural holdings for All Social Groups**
 233 **(percentage):**

Social Groups	Number (in '000)	Area (in '000 ha)	Percentage of Landholding
Marginal <1ha	1848	764	68.23
Small 1-2ha	429	591	15.83
Semi-medium 2-4ha	283	775	10.44
Medium 4-10ha	129	725	4.75
Large >10ha	20	311	0.75

234 Source: GOI (2011) Agriculture Census. p. 17-21

235 **3.10 Low yield initially:**

236 During the initial days of organic cultivation the productivity of the land goes down
237 drastically, and a marginal farmer is unable to bear the risk of having a low yield during the
238 initial stage of the conversion i.e.2-3 years. And the different policies made by the state
239 government, along with relief scheme is not available to the farmers during this period
240 (Narayan 2005, p 69). Other problems like lack of efficient schemes run by the government
241 which promotes organic farming, lack of certification agencies and lengthy process are a few
242 major reasons for the farmer not interested towards it.

243

244

245 **5. Solutions to the Problem**

246 The solution stated below are beneficial for farmers as well as the ecology. It will give the
247 farmers enough opportunity to grow commercially as well as organically. This will includes
248 Contract Organic farming and Participatory Guarantee System and promoting Animal
249 Husbandry ought to be promoted.

250 **5.1 Public Private Partnership (PPP) for Promoting Organic Agriculture:**

251 Public Private Partnership can prove a real game changer in the Organic agriculture sector.
252 The government, private companies along with the education as well as research and
253 development can transform the organic agriculture at multiple level. With the government
254 financing the project/model, while the private sector has the technical expertise while the
255 farmer will do the rest. The duty of research and development would be to create awareness
256 among people about the benefits of organic farming and their products and the ill-effects of
257 chemical farming. The government could also play an important role in creating an
258 environment for the private investment through an increase in public spending, priority sector
259 lending, Foreign Direct Investment (FDI), Tax relaxation, and Duty exemption (Choudhary,
260 2015)

261 **5.2 Contract Organic Farming (COF)**

262 It is the contract between the buyer (firm) and the farmer, where he produces the agricultural
263 products and supplies directly to the buyer. Both of them agree on certain terms and
264 conditions for the sale and purchase of the product. In this system the companies meet the
265 farmer from time to time and provide them all the latest agronomic and technical help
266 possible for producing the crops (Dutta, Dutta, & Sengupta, 2016).

267

268 Similarly, in the contract organic farming, the farmer will be provided with all the organic
269 amenities required by the farmers to produce organically like bio fertilizer, vermicompost,
270 manures etc. In this type of farming there is some point that makes it a solid proof for the
271 farmers to sustain economically and environmentally.

272 i. The price is already fixed

273 ii. Quality and quantity fixed

274 iii. Duration of the crop is based on the demand of the company crops (Dutta, Dutta,
275 & Sengupta, 2016).

276 Hence, it will help the farmers of Jharkhand to farm organically and with the help of multi-
277 national companies it will be easier for the farmers to convert their field by coming in
278 contract. It will help them economically, socially as well as ecologically.

279 **5.3 Participatory Guarantee System (PGS)**

280 PGS are defined as “quality assurance initiatives that are locally relevant, emphasize the
281 participation of stakeholders, including producers and consumers and operate outside the
282 frame of third party certification” (May, 2008, p. v). May (2008, p. 6-8) elaborates a few
283 basic elements required for PGS: participatory approach and collective responsibility,
284 transparency, trust, non-hierarchical, same goal of having higher standards in production,
285 excluding social injustice, eco-friendly, and respect for the autonomy of local communities
286 and cultural differences. In PGS the members of the group conduct peer review of another
287 member of the farm, to check the organic standard of the field and the member do agree to
288 face the consequences for any infringement. Like if a farmer is being caught using the
289 prohibited inputs, then he/she will be fined or may be thrown out of the group (Hill, 2016).

290 The government of Jharkhand solely or collaborating with non-governmental organization
291 can come up with a plan of forming PGS, where the farmers with small holding will form a
292 group. PGS will work as an umbrella under which all farmers will be certified based on the
293 review given by the group member. This will encourage the farmers in practicing the organic
294 farming and develop collectively.

295 **5.4 Forming Farmer Producer Organisation:**

296 “Producer Organisation is an association, a society, a cooperative, a union, a federation or even a firm
297 that has been established to promote the interests of farmers” (Panda & Singh, 2016). In this the
298 farmers are the stakeholders in the organization and ate from either farm or non-farm activities with

299 all legal validation and deals with the primary producers. In the FPO the profit is shared among the
300 producers and some share is kept as reserves. “Fund of 200 crores by the Government NABARD
301 to be utilized for the building and promotion of 2000 Farmer Producer Organizations in two years” (
302 efresh, 2014) which meant that the Government is coming up open hand to help the FPO and to
303 produce the product which will help them fetch good price by neglecting the mediators. Hereby
304 helping the farmers to earn profit and to make their agriculture more than subsistence. So the farmers
305 after forming FPO and practice organic farming could prove a real asset for their development.

306

307

308 **5.5 Promoting Animal Husbandry**

309 The beef ban has decreased the price of the cattle, which has affected the farmers directly as
310 well as indirectly. The farmers after getting hit by bad harvests due to drought and
311 unseasoned rain, can compensate their income with the allied activities of animal husbandry (
312 Deccan Herald, 2016). Therefore, some steps related to the situation should be taken by the
313 government to promote animal husbandry. Similar is the situation with upgrading the
314 technical aspects of the farm, as the farmers show less interest in keeping cattle, as the
315 majority of the farm work which was earlier done by the cattle are now done by tractors and
316 other implements saving the time for the farmers and is the new trend now. It is important for
317 a farmer to have livestock, as not only it will produce dung which will be used for as the
318 fertilizer, it will work as a secondary source of income for the farmers. It will also work as a
319 money saver as the fertilizer could be used by the farmer and the cost of purchasing fertilizer
320 will get deduced and hereby could increase the profit rate of the farmer.

321 Some other suggestions could be

- 322 i. Substantial financial support to the farmers who are willing to convert their field, but
323 are unable to because of financial problems.
- 324 ii. Market development for organic product produced by the farmers.
- 325 iii. Proper organization for inspection and certification.
- 326 iv. Identification of crop for that very farm based on soil type ecological condition is
327 necessary so as to get the best production ex soybean in Madhya Pradesh period
328 (Narayan 2005, p 77).

329 **6. Conclusion**

330 The interest in organic farming is increasing among the farmers as the present conventional
331 method of farming has degraded enough of the natural resources (Scialabba, 1998). The
332 awareness among the producers and the consumer is increasing, but at a steady rate. Another
333 benefit which our country can reap is that as organic farming is labour intensive mechanism
334 and our country, where labour is abundant and cheap, we could exploit this opportunity for
335 the betterment in organic farming. “Currently, most of the organic farmers in India are still in
336 the transition phase and hence their costs are still high. As these farmers continue with
337 organic farming, the production costs are expected to reduce, making India as one of the most
338 important producers of organic food” (Chandrashekhar, 2016). The eagerness among the
339 policy makers to develop new policies for promoting organic agriculture is there. But all this
340 is available at a slower rate; we need to pace up the transforming process (Conventional to
341 Organic) for Ecology as well as for the economy.

342 Farmers can enjoy several other benefits by adopting organic farming. Which could be
343 bifurcated in three categories

344

- 345 i. Social benefits – Organic farming does show a positive attitude towards the
346 farming community as the earlier the farmer’s son would never want to be a
347 farmer, but with the increase in the demand for organic products there chances of
348 decrease in village duress because of migration. Secondly, helping in food
349 security not only quantity wise, but also quality-wise the food produced
350 organically are of high standards.
- 351 ii. Ecological benefits – Conservation of natural resources being one of the principle
352 of organic farming, it helps in maintaining the soil fertility, prevention of soil
353 erosion and tackles other ecological problems.
- 354 iii. Economic benefits – any farmer which is cultivating this about the economic
355 aspect of the production and if he/she will get the profit, then economically as
356 well as ecologically than the farmer will continue to grow organically which will
357 not only increase in livelihood opportunities but getting the farmers a better price
358 of their products.

359 All in all it’s a win-win situation for the farmers who opt for organic farming, they just need
360 to bear a few difficulties during the initial stage and later on it will be an easy and successful

361 phase for them. It will not only help the environment but also help the country as it will
362 decrease the problem of food security and other menaces.

363

364 **7. References**

365 Amarnath, J. S., & Sridhar, V. (2012). An Economic Analysis Of Organic Farming In Tamil
366 Nadu , India. *The Bangladesh Journal of Agricultural Economics*, 2(XXXV), 33–51.

367 Chandrashekar, H. M. (2010). Changing scenario of organic farming in India : An overview,
368 5(1), 34–39.

369 Choudhary, S. (2015, November 4). *Making India's agriculture sustainable through PPPs*.

370 *Livemint*. Retrieved from

371 [http://www.livemint.com/Opinion/jituv4uEq9dEbki7RPgKsL/Making-Indias-
372 agriculture-sustainable-through-PPPs.html](http://www.livemint.com/Opinion/jituv4uEq9dEbki7RPgKsL/Making-Indias-
372 agriculture-sustainable-through-PPPs.html)

373 Cattle crisis after beef ban. (2016, March 29). *Deccan Herald*. Retrieved from

374 <http://www.deccanherald.com/content/537541/cattle-crisis-beef-ban.html>

375 Deogharia, J. (2016, February 04). Jharkhand makes slow but steady switch to organic
376 farming. *The Times of India*. Retrieved from

377 [http://timesofindia.indiatimes.com/city/ranchi/Jkhand-makes-slow-but-steady-switch-to-
378 organic-farming/articleshow/50844401.cms](http://timesofindia.indiatimes.com/city/ranchi/Jkhand-makes-slow-but-steady-switch-to-
378 organic-farming/articleshow/50844401.cms)

379 Dutta, A., Dutta, A., & Sengupta, S. (2016). A Case Study of Pepsico Contract Farming For
380 Potatoes. *IOSR Journal of Business and Management*, 75-85. Retrieved from

381 <http://iosrjournals.org/iosr-jbm/papers/ICSE%20Conference/14.75-85.pdf>

382 GOI (2011) Agriculture Census. All India Report on Number and Area of Operational

383 Holdings. *Agriculture Census Division, Department Of Agriculture & Co-Operation,*

384 *Ministry Of Agriculture, Government Of India*. Retrieved from

385 <http://agcensus.nic.in/document/agcensus2010/completereport.pdf>

386 GOI (2016b) Operational manual. Local groups. *Participatory Guarantee System for India,*

387 *National Centre of Organic Agriculture, Department of Agriculture and Cooperation,*

388 *Ministry of Agriculture and Farmers Welfare, Government of India*. Retrieved from

389 <http://www.pgsindia-ncof.gov.in/home.aspx#>

390 Guidelines for Farmer Producer Organization (2014). *Efresh global*, 1-10. Retrieved from

391 [http://efreshglobal.com/efresh/Static/WhatsNew_Docs/2015_2_6_14_39_3_Guidelines
392 %2520for%2520Farmer%2520Producer%2520Organizations\(FPO\).pdf&ved=0ahUKE
393 wj9oIrmzdVSAhVVFu7wKHUu3BUUsQFggBMAA&usg=AFQjCNEs4sGY8VrhmT8nqG](http://efreshglobal.com/efresh/Static/WhatsNew_Docs/2015_2_6_14_39_3_Guidelines
392 %2520for%2520Farmer%2520Producer%2520Organizations(FPO).pdf&ved=0ahUKE
393 wj9oIrmzdVSAhVVFu7wKHUu3BUUsQFggBMAA&usg=AFQjCNEs4sGY8VrhmT8nqG)

394 [C3tOpvqw0X1g&sig2=FNivw1pw0iAfXAF0sboxa5Q](https://doi.org/10.1080/10455752.2015.1051565)

395 Hill, J. (2016). Organic Agriculture in India and Participatory Guarantee Systems (PGS): A
396 case study of West Bengal. *Jharkhand Journal of Development and Management*
397 *Studies*, 14(2), 7037-7055.

398 Hill, J. K. W.(2015). F 1 Hybrid Rice in Eastern India : Silver Bullet or Capitalist Ploy ? F 1
399 Hybrid Rice in Eastern India : Silver Bullet or, 5752(December).
400 <https://doi.org/10.1080/10455752.2015.1051565>

401 IFOAM (2015). *Position paper. The full diversity of organic agriculture: What we call*
402 *organic*. Bonn: IFOAM – Organics International.

403 May, C. (2008). PGS guidelines. How participatory guarantee systems can develop and
404 function. Bonn: IFOAM. Retrieved from
405 http://www.ifoam.bio/sites/default/files/page/files/pgs_guidelines_en_web.pdf

406 Narayan S. (2005). Organic farming in India : relevance, problems and constraints. *NABARD-*
407 *Mumbai* retrieved from <https://www.nabard.org/pdf/OC%2038.pdf>

408 OFAJ. (2013). About us, Organic Farming Authority of Jharkhand (OFAJ), Government of
409 Jharkhand. Retrieved from <http://organicjharkhand.in/about.html>

410 Purohit, S.S., & Gehlot, D. (2005). Trends in Organic Farming in India. *Agrobios*, India.

411 Scialabba, N. (1998 November). FAO’s technical contribution to IFOAM's Scientific
412 Conference, 16–19. Retrieved from <ftp://ftp.fao.org/docrep/fao/003/c116e/ac116e00.pdf>

413 Singh, R.P. & Singh, S. (2016 June). Optimising Seed Replacement Rates in Jharkhand:
414 Present Scenario, Challenges and Opportunities. *Jharkhand Journal of Development and*
415 *Management Studies*, 14(2), 6987-7007.

416 Venkateswarlu, B., Balloli, S. S., & Ramakrishna, Y. S. (2007). *Organic Farming in Rainfed*
417 *Agriculture*. Hyderabad: Central Research Institute for Dryland Agriculture. Retrieved
418 from www.crida.in/Bulletins/Organic%20farming.pdf

419 Wai, O. K. (2016). Organic Asia 2015. In H. Willer, & J. Lernoud (Eds.), *The world of*
420 *organic agriculture. Statistics and emerging trends 2016* (pp. 172-181). Frick: Research
421 Institute of Organic Agriculture (FiBL) and Bonn: IFOAM – Organics International.

422 Yadav, A.K.(n.d.). Organic Agriculture. New Delhi: National Center for Organic Farming,
423 Retrieved from
424 http://ncof.dacnet.nic.in/Training_manuals/Training_manuals_in_English/Organic_Agri
425 [culture_in_India.pdf](http://ncof.dacnet.nic.in/Training_manuals/Training_manuals_in_English/Organic_Agri)

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