Supplementary Appendix S1

A1. Codes for the Bayesian model

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| # 1............chickpea priorsmodel {  for (i in 1 : N){ Yield[i] ~ dnorm( mu[i], tau.e[Variety[i]] )  mu[i]<- m+ rho[District[i],Variety[i]] }# Priors  m ~ dnorm(0, 1.0E-6) # is a must to adjust to the local mean value level  # Priors 1 & 2 rho[1,1] ~ dnorm(0, 6.28) # Farmer practice- district 1 rho[2,1] ~ dnorm(0, 6.28) # farmer practice--district 2  rho[1,2] ~ dnorm(0, 1.E-6) # Recommended practice..district 1 rho[2,2] ~ dnorm(0, 1.E-6) # Recommended practice..district 2 # Priors 1: Positive normals sig.e[1] ~ dnorm(0.10,509.6)I(0,)  sig.e[2] ~ dnorm(0.22,18.4)I(0,)   tau.e[1]<- 1/(sig.e[1]\*sig.e[1]) tau.e[2]<- 1/(sig.e[2]\*sig.e[2])# or Priors 2: Log normals # sig.e[1] ~ dlnorm(-2.34, 5.43) # sig.e[2] ~ dlnorm(-1.91, 1.01) # Predict pred[1,1]<- m + rho[1,1] pred[2,1]<- m + rho[2,1] pred[1,2]<- m + rho[1,2] pred[2,2]<- m + rho[2,2] } # end of BUGS codes |

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| # 1............Mung bean priorsmodel {  for (i in 1 : N){ Yield[i] ~ dnorm( mu[i], tau.e[Variety[i]] )  mu[i]<- m + rho[District[i],Variety[i]] }# Priors  m ~ dnorm(0, 1.0E-6) # is a must to adjust to the local mean value level  # Priors 1 & 2 rho[1,1] ~ dnorm(0, 51.0) # Farmer practice- district 1 rho[2,1] ~ dnorm(0, 51.0) # farmer practice--district 2  rho[1,2] ~ dnorm(0, 1.E-6) # Recommended practice..district 1 rho[2,2] ~ dnorm(0, 1.E-6) # Recommended practice..district 2 # Priors 1: positive normal # sig.e[1] ~ dnorm(0.11,316.6)I(0,)  # sig.e[2] ~ dnorm(0.17,19.6)I(0,)   tau.e[1]<- 1/(sig.e[1]\*sig.e[1]) tau.e[2]<- 1/(sig.e[2]\*sig.e[2])# or Priors 2: log normal sig.e[1] ~ dlnorm(-2.36, 2.64) sig.e[2] ~ dlnorm(-2.32, 1.03) # Predict pred[1,1]<- m + rho[1,1] pred[2,1]<- m + rho[2,1] pred[1,2]<- m + rho[1,2] pred[2,2]<- m + rho[2,2] } # end of BUGS codes |

A2. R codes used for reading data and Bayesian simulations

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| library(lattice)library(coda)library(R2WinBUGS)#::::::::::::: Chickpea Onfarm trials plot-wise Yield records # Type District District\_code ProvCode Province Season Variety YearCode Year Yielddata<- read.table("DataPlotwiseYield2012ChickpeaOnFarmTr.txt", header=TRUE)dataVariety<- as.factor(data$Variety)Yield<- data$YieldDistrict<- as.factor(data$District)df<- data.frame(District,data$District,Variety,Yield)ddply(df, ~District\* Variety, summarise, mean=mean(Yield), sd=sd(Yield))levels(factor(data$Variety)); levels(factor(data$District))Variety<- as.numeric(Variety)District<- as.numeric(District)# 1: Baghalan\_e\_sannati , 2: Phul\_i\_khumiri# 1. Farmer is "Local", 2: Recommended is "Madad"N<- length(Yield)N#.......datadata<- list("Yield", "Variety", "District", "N")#.......initial values (rho[ district; Variety]; others sigmas homogeneousinits1<- list( m=2, rho=structure(.Data=c(rep(.1, 2), rep(0.15,2)),.Dim=c(2,2)), sig.e=c(0.21,.21))inits2<- list( m=2, rho=structure(.Data=c(rep(.15, 2), rep(0.1,2)),.Dim=c(2,2)), sig.e=c(0.22,.22))inits3<- list( m=2, rho=structure(.Data=c(rep(.2, 2), rep(0.25,2)),.Dim=c(2,2)), sig.e=c(0.23,.21))inits <- list(inits1, inits2, inits3)#.......initial values (rho[ district; Variety]; others sigmas homogeneous...lognormalinits1<- list( m=2, rho=structure(.Data=c(rep(.1, 2), rep(0.15,2)),.Dim=c(2,2)), sig.e=c(.11, .16)) inits2<- list( m=2, rho=structure(.Data=c(rep(.15, 2), rep(0.1,2)),.Dim=c(2,2)), sig.e=c(0.12, 0.15)) inits3<- list( m=2, rho=structure(.Data=c(rep(.2, 2), rep(0.25,2)),.Dim=c(2,2)), sig.e=c(0.1, .1)) inits <- list(inits1, inits2, inits3)#.....parametersparameters <- c( "pred", "sig.e")#.....run BUGSOnFarm.sim <- bugs(data, inits, parameters, "OnFarmTrial-bug.bug", n.chains=3, n.iter=500000, n.sims=10000, debug=TRUE)# Use the simulated values for developing inferential summariesattach.bugs(OnFarm.sim)library(ggplot2)n.simsNSims<- n.simsNSims# Posteriors of these#Safety probability# Define a targetTarget<- c(seq(1.5, 3.0, by=.05))NTg<-length(Target) NTgPrGt<- array(0, dim=c(NTg,2,2)) # Dim(Target, district , Variety) for(j in 1:NTg){ for (i in 1: 2) { for (k in 1: 2) { PrGt[j,i,k]<- sum( pred[,i,k] > Target[j])/NSims } } } print(cbind(Target,PrGt))# Plotsh1<- c(rep("Local at Baghalan\_e\_sannati", NTg), rep("Madad at Baghalan\_e\_sannati", NTg), rep("Local at Phul\_i\_khumiri", NTg), rep("Madad at Phul\_i\_khumiri", NTg))dfThis<- data.frame(Practice=as.factor(h1), Targ= c(Target, Target, Target, Target), Probs= c(PrGt[,1,1], PrGt[,1,2],PrGt[,2,1],PrGt[,2,2]) )  dfThisggplot(dfThis, aes(x=Targ, y=Probs)) + geom\_line(aes(colour=Practice, group=Practice)) +  geom\_point(aes(colour=Practice),size=3) + xlab("Target yield (t/ha)") +  ylab("Probability of exceeding the target") + ggtitle("Risks associated with seed yield from Madad and a local chickpea variety")  |