Water Resources Research

Supporting Information for

A Behavioral Social Learning Model for Studying the Dynamics of Forecast Adoption

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Additional Supporting Information (Files uploaded separately)

Data Sets S1 to S2
Movies S1 to S4

Introduction

The supporting information we provide includes Figures S1 through S9, Data Sets S1 and S2, and Movies S1 through S4. The figures provide supplementary information pertaining to the results and discussions presented in the paper. Data sets include time series of drought events and forecasts as well as the parameters used in the agent-based model. The animations show the spatial and temporal diffusion dynamics in the various scenarios considered in the main text.

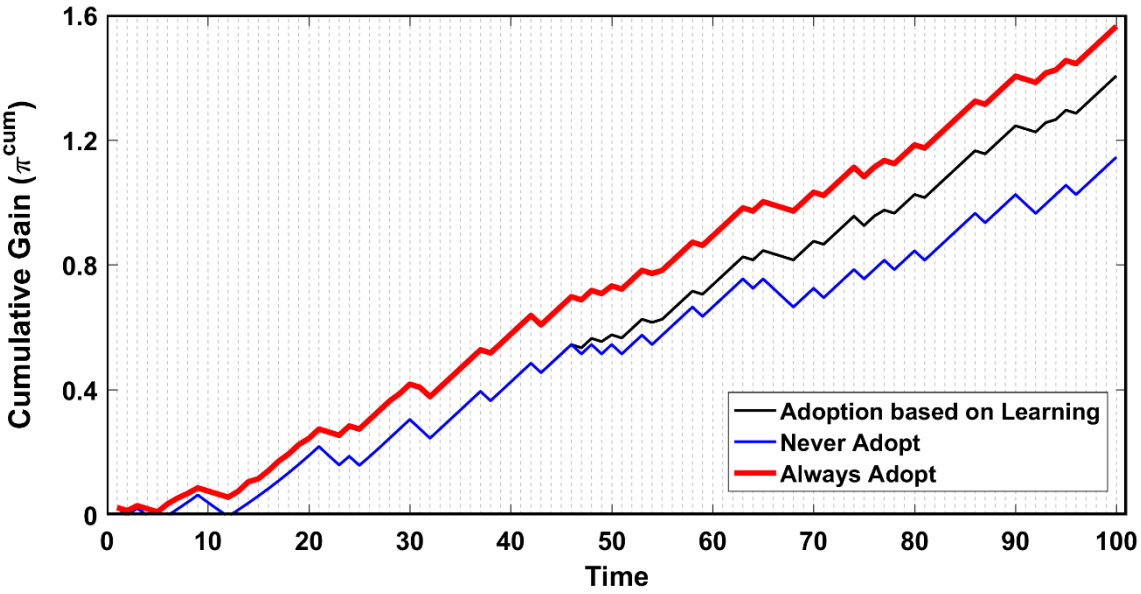

Figure S1. Cumulative economic gains when decisions are informed by climatological information, forecasts, and the adoption mechanism shown in Figure 4.

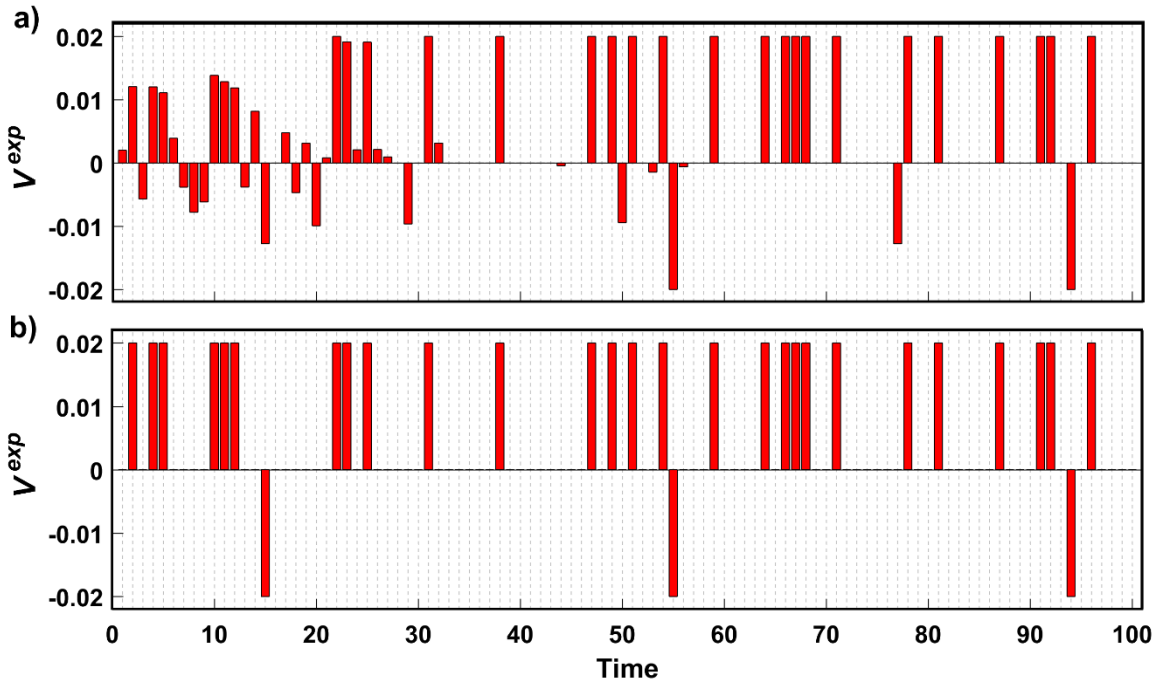

Figure S2. Time series of *ex post* values of forecasts corresponding to belief trajectories shown in Figure 5b for (a) $r = 0.5$ and (b) $r = 10$.

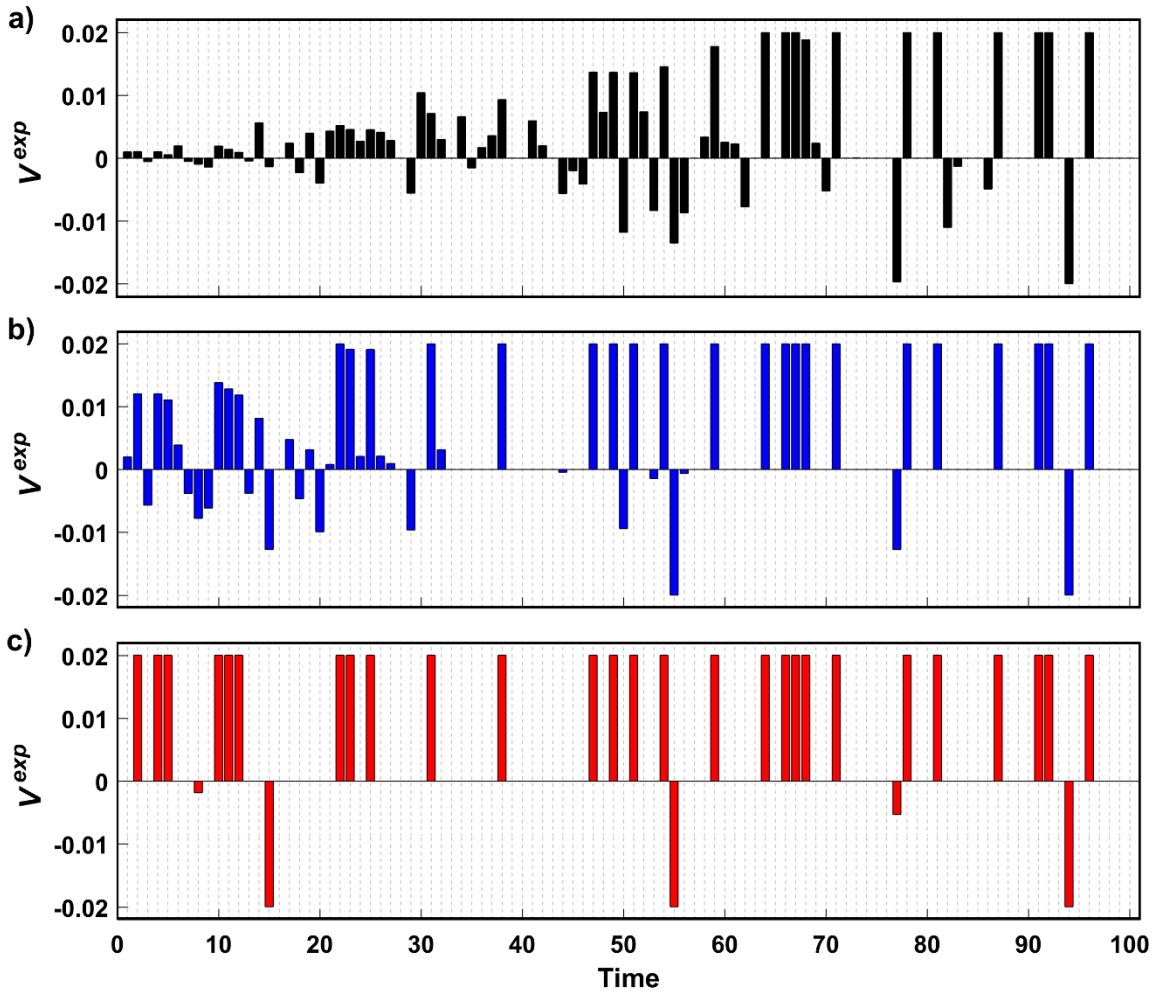

Figure S3. Time series of *ex post* values of forecasts corresponding to belief trajectories shown in Figure 5c for (a) $\omega = 0.25$, (b) $\omega = 0.5$, and (c) $\omega = 1$.

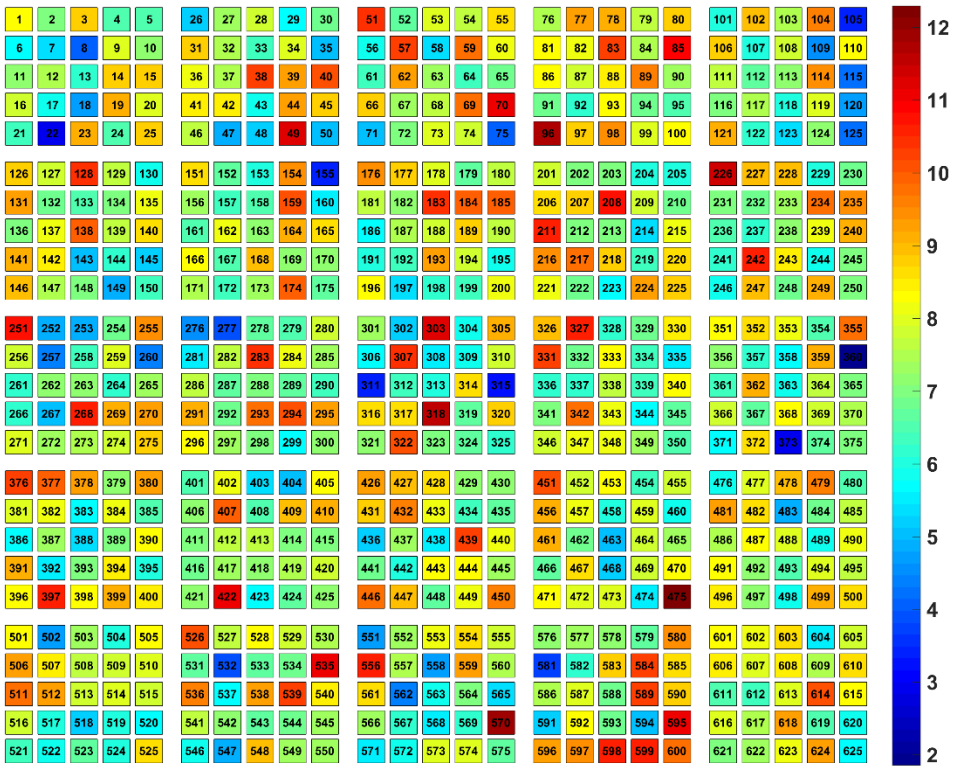

Figure S4. Agents' risk aversion (r), randomly generated according to $r \sim N(7.5,1.5)$. See Data Set S1 for the parameter values.

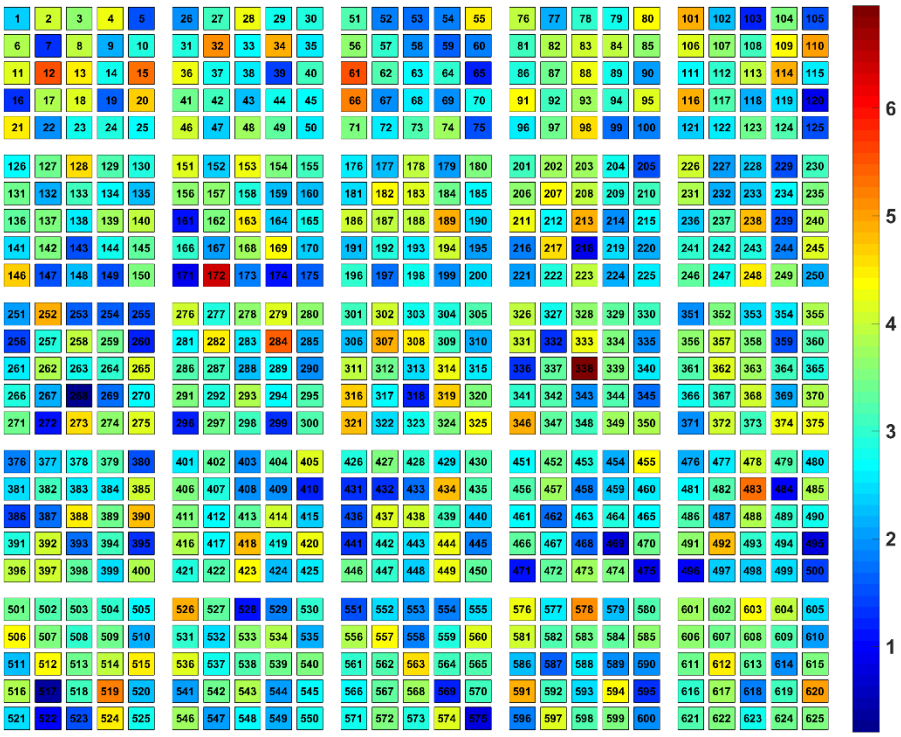

Figure S5. Agents' learning rate (τ), randomly generated according to $\tau \sim N(3.0.1.0)$. See Data Set S1 for the parameter values.

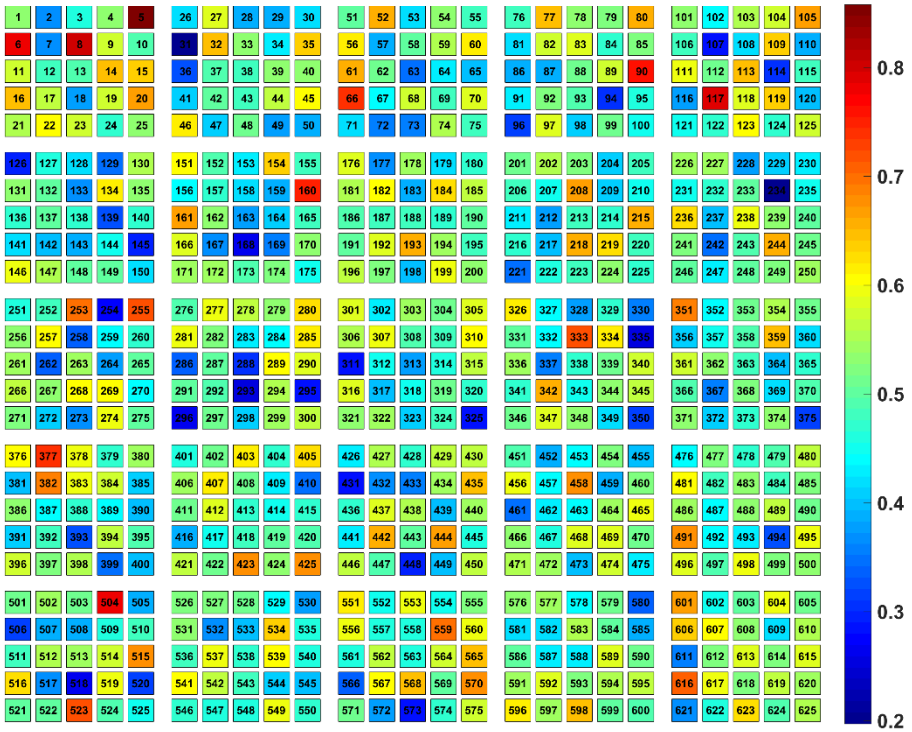

Figure S6. Agents' initial wealth ($\boldsymbol{\omega}$), randomly generated according to $\omega \sim N(0.5, 0.05)$. See Data Set S1 for the parameter values.

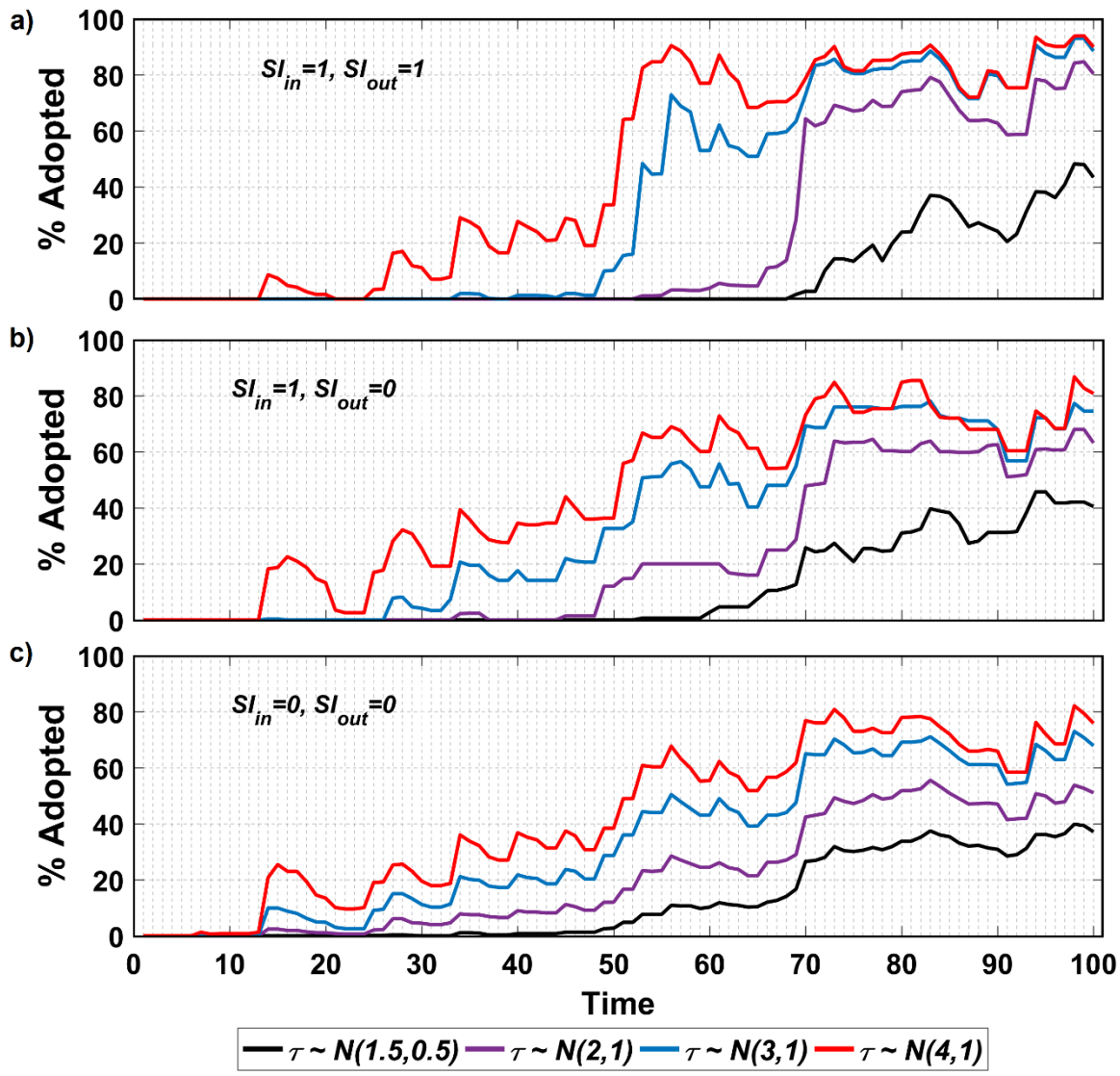

Figure S7. Diffusion curves for learning-rate scenarios: (a) Full social interaction, (b) intra-county ties only, and (c) no interaction. Risk aversion and initial wealth are randomly assigned based on $r \sim N(7.5,1.5)$ and $\omega \sim N(0.5,0.05)$. See Data Set S1 for the parameter values.

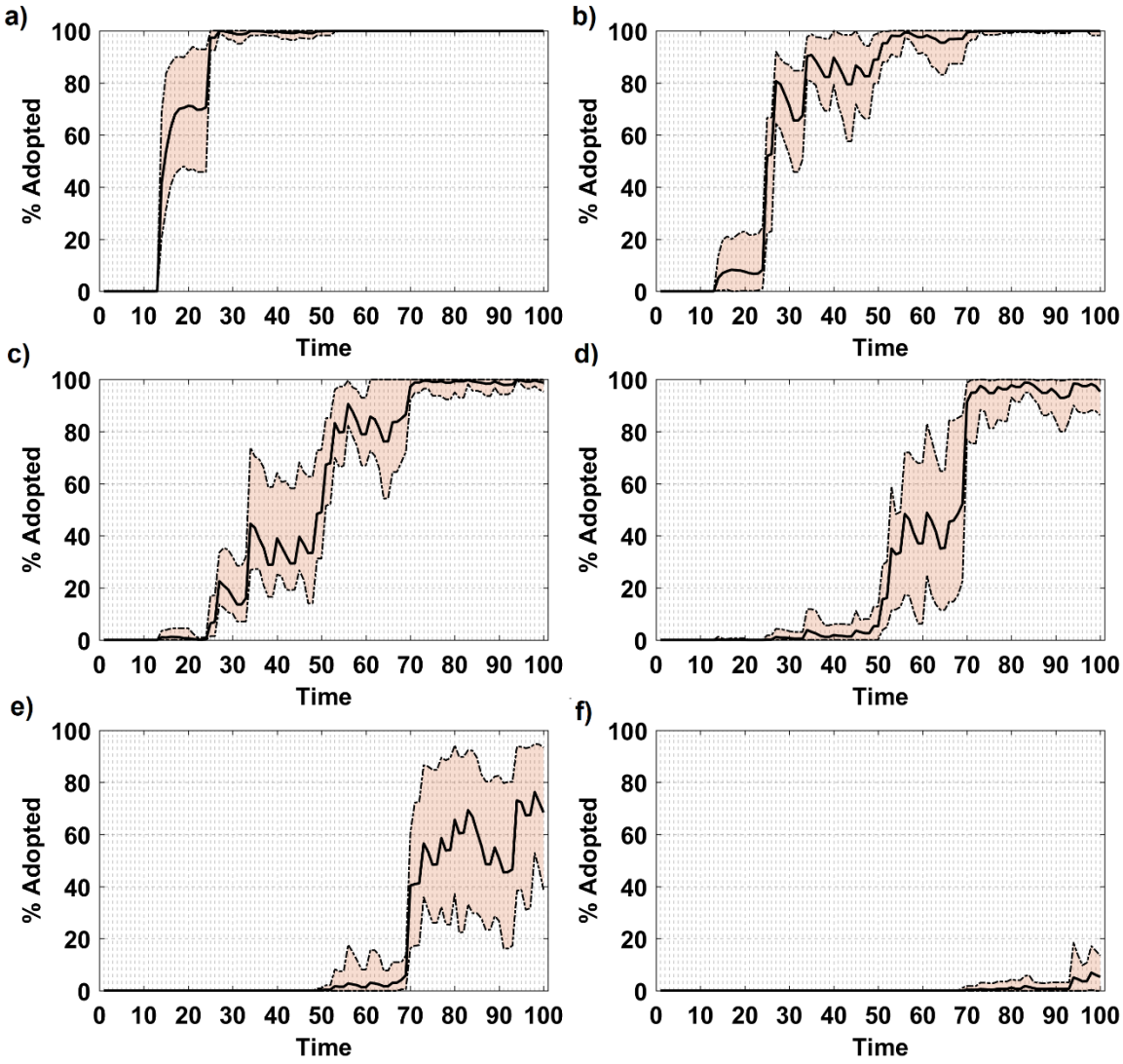

Figure S8. Impact of forecast accuracy on forecast-adoption diffusion. (a) $\kappa = 0.8$, (b) $\kappa = 0.75$, (c) $\kappa = 0.725$, (d) $\kappa = 0.7$, (e) $\kappa = 0.675$, and (f) $\kappa = 0.65$. Shaded areas represent the envelopes of diffusion curves for the 15 realizations of the forecast time series considered, and solid black lines represent mean values.

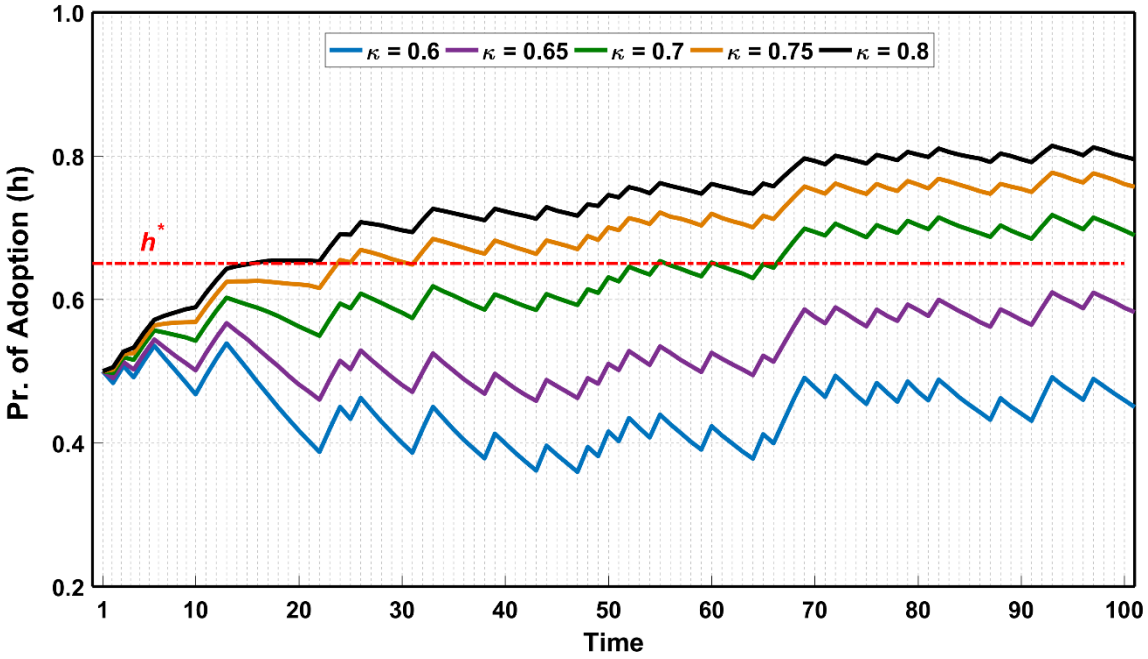

Figure S9. Evolution of the probability of forecast adoption averaged across all agents and 15 realizations of forecast time series in forecast-accuracy scenarios.

Data Set S1. Time series of drought events and drought forecasts as well as randomly generated model parameter values, including learning rate (τ), the coefficient of risk aversion (r), and initial wealth (ω).

Data Set S2. Time series of drought forecasts generated based on the following forecast accuracy values ($\kappa = 0.6, 0.625, 0.65, 0.675, 0.7, 0.725, 0.75, 0.8$). For each case, 15 realizations are generated.

Movie S1. The impact of social interaction on forecast-adoption diffusion in the case-study area. Two social interaction scenarios are considered: Full interaction (i.e. $SI_{in} = 1$ and $SI_{out} = 1$) and no interaction (i.e. $SI_{in} = 1$ and $SI_{out} = 1$).

Movie S2. The impact of change agents on forecast-adoption diffusion in the case-study area. All agents in the middle county (county 13) are considered change agents. Learning rate ($\boldsymbol{\tau}$) values are randomly assigned based on a normal distribution $N(3,1)$.

Movie S3. The impact of change agents on forecast-adoption diffusion in the case-study area. Agents whose initial wealth is above the 90th percentile are considered change agents. Two self-reliance scenarios are considered: $\alpha_{ii} = 0.5$ and $\alpha_{ii} = 1.0$.

Movie S4. The impact of asymmetrical learning on forecast-adoption diffusion in the case-study area. Two scenarios are considered: $\gamma = 1$ and $\gamma = 1.5$.